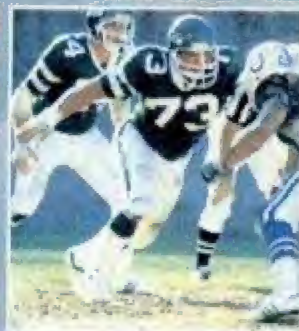


OCTOBER 1983

\$1.50

# Popular Mechanics

**DRESSED TO KILL:**  
New Body Armor  
For Pro Football  
Battles



## MIAMI'S SPECTACULAR SEAGOING FIRE ENGINE

**NEW CARS:** GM, FORD, AMC  
Plus A Home Mechanic's  
View Of All The '84s

**HOME WIRING:** 10 Real  
Improvements You Can  
Make (Fearlessly)

**CAR-CARE  
SPECIAL:**  
Winterproof  
Your Car In  
A Weekend

**TINY POWER  
TOOL** That  
Carves,  
Grinds,  
Engraves —  
And More!

**PLANS:** Make  
Our Replica Of  
Mark Twain's  
Portable Desk

**NASA:** 25 Years  
Of Beating The  
Odds In Sp





**NEW KODAMATIC™ TRIMPRINT™ INSTANT COLOR FILM.**

# KODAK WILL CHANGE YOUR IMAGE OF INSTANT PHOTOGRAPHY.

David Copperfield

**1** Watch the brilliant color develop before your eyes.

**2** Then, any time after an hour, you can lift the picture off the back.

**3** Now you have a Trimprint™ without a bulky back. You can even trim it or crop it.

**4** It's so thin, it fits where other instant pictures can't. Keep it in an album with your other treasured prints.

This is the most versatile instant film ever, with great color by Kodak. Share it in an instant. Then keep it like a regular print. It's the instant you and your photo album have been waiting for. New Kodamatic™ Trimprint Instant Color Film. Only for Kodamatic cameras. And only Kodak could pull it off.



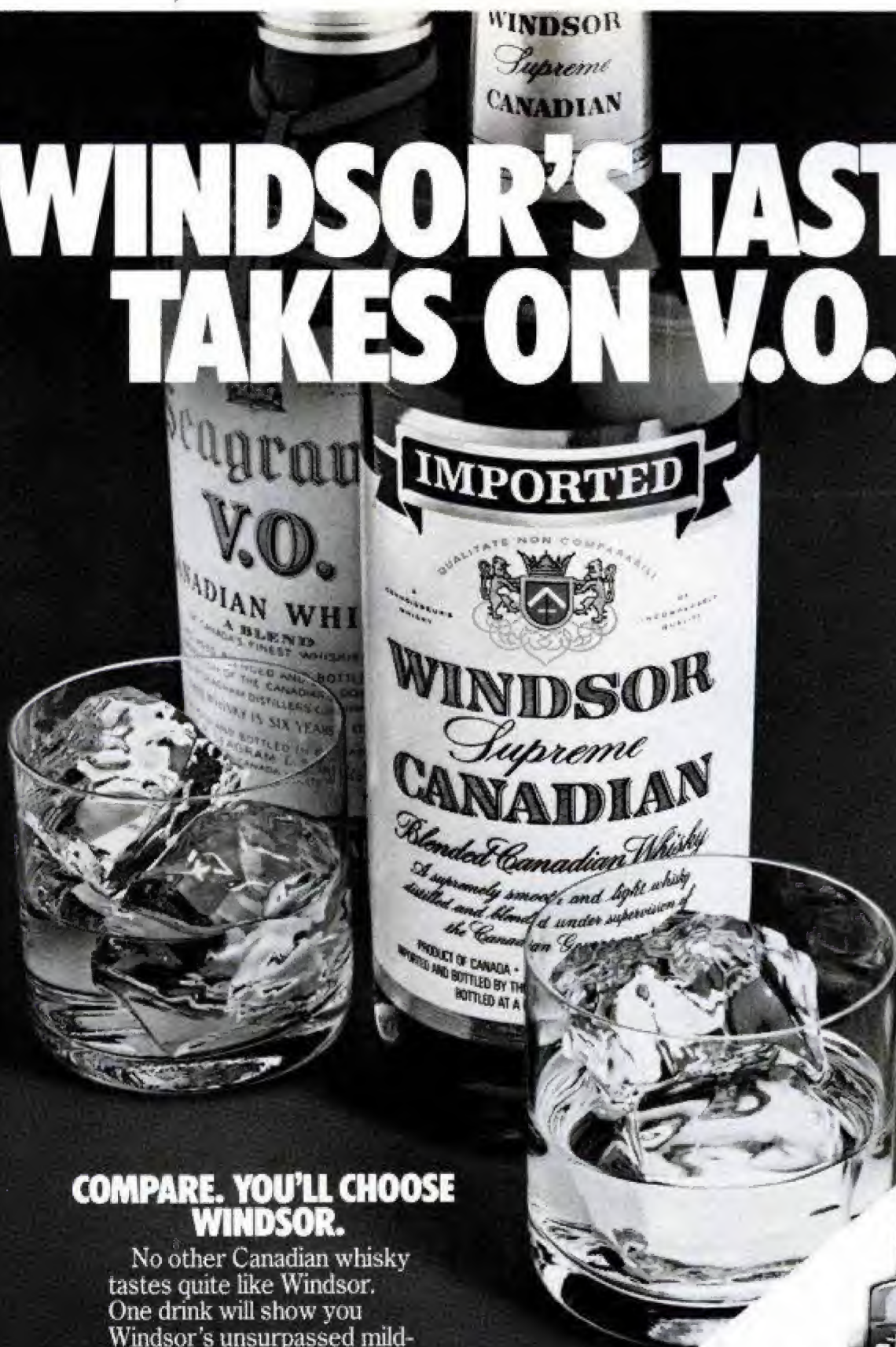
Official Film  
XIV Olympic  
Winter Games



**IT'S AN INSTANT PRINT.  
IT'S A REGULAR PRINT.  
IT'S A TRIMPRINT.™**



# WINDSOR'S TASTE TAKES ON V.O.



## COMPARE. YOU'LL CHOOSE WINDSOR.

No other Canadian whisky tastes quite like Windsor. One drink will show you Windsor's unsurpassed mildness, satin smoothness, pure drinkability. Our taste stands out. That's why Windsor stands alone.

**WINDSOR**   
ONE CANADIAN STANDS ALONE

This One



HFH9-4P5-029F

**NOW  
AVAILABLE IN THE  
TRAVELER FLASK.**

Our new lightweight 750ml bottle.\*





# Isuzu invites you to drive a hard bargain!

"Low, low interest!"

"Factory rebates!"

"Special deals on selected models!"

These days anybody interested in a compact truck has to be driven up a wall trying to figure out what the best deal is.

It seems the truck business has gone from EPA figures to CPA figures.

At Isuzu we think it's time to apply the brakes to all this nonsense. After all, what good is driving a hard bargain if you're going to wind up driving a soft truck. Well, with Isuzu you can be sure that will never happen. Not only can your Isuzu dealer give you a deal as good as anybody else—but he'll give you a truck that's better than anybody else.



For instance, in the all-important area of fuel economy, our longbed beats the pants off of Toyota and Nissan with 39 highway and 28 MPG city.

Of course, just because we're the world's toughest truck you should also know that an Isuzu has a soft spot. The inside. Once you step inside, you'll have more leg and head room than a mini-pick-up is supposed to have. With a choice of three across seating or bucket seats if you're so reclined.

If you're in the market for a truck don't be misled by tricky interest rates or fancy deals. Go for the truck that is able to deliver the best price/value for your money.

You see, in the long haul, you're always better off with an Isuzu truck.

## Tougher than the world's toughest roads.

ISUZU STANDARD BED TRUCK \$5775 MANUFACTURER'S SUGGESTED RETAIL PRICE P.D.E. EXCLUDING TAX, LICENSE, TRANSPORTATION. 39 MPG HIGHWAY/28 MPG CITY. USE EPA ESTIMATES FOR COMPARISONS ONLY. YOUR MILEAGE MAY VARY DUE TO SPEED, WEATHER AND TRIP LENGTH. CALIFORNIA MPG WILL BE LESS.

Isuzu North America, Inc. 1987 Isuzu Truck Division



# Popular Mechanics®

VOLUME 160 NUMBER 4



## ON THE COVER

When Miami firemen rush to a fire, they may go by land or sea—whichever is the fastest way to get there. Read about their remarkable new amphibious fire engine that can go anywhere it's needed. Story starts on page 93.

—PM painting by Ed Valigursky

OCTOBER 1983

INTERNATIONAL EDITIONS: CARIBBEAN, MEXICO, SOUTHERN HEMISPHERE

## AUTOMOBILES AND BIKES

- Imports and Motorsports 10
- Detroit Listening Post 14
- Car Clinic 20
- The PM Garage 38
- Firsthand Report:
- Riding the Suzuki GS550E 76
- Detroit '84: AMC 106
- Detroit '84: Ford 108
- Detroit '84: GM 110
- Under the hood: Jeep power for AMC 114
- Under the hood: Chrysler goes turbo 116
- Under the hood: Ford refines turbos 118
- Under the hood: GM drops distributor 120

## BOATING AND OUTDOORS

- All Outdoors 12

## PREWINTER CAR CARE GUIDE

- 122 Section 1: Cooling system
- 126 Section 2: Cold starting
- 130 Section 3: Engine tuneup
- 134 Section 4: Battery
- 138 Section 5: Suspension
- 142 Section 6: Tires and wheels
- 144 Section 7: Body and paint
- 148 Car recalls

## HOME AND YARD

- 26 Appliance Clinic
- 28 Homeowners' Clinic
- 30 New Now for home and shop
- 34C How to do home wiring fixups right
- 48 Buttoning up an energy sieve
- 66 A wood-heated, prize-winning house



106



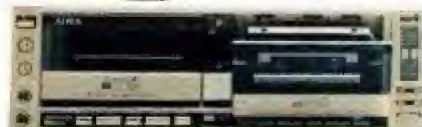
81



89



94



100

## SCIENCE AND ENGINEERING

- Science Worldwide 24
- NASA: 25 years of great space exploration 81
- Pro football high-tech: Dressed to kill 89
- Seafaring fire engine 93
- Infrared missile on target 181
- "Roadside" repair in space 182
- New "eyes" for pilots 183
- Sea power is patented 184
- New stove saves fuel 184
- Thermography may help back pain 184

## ELECTRONICS, RADIO AND TV

- PM Electronics Monitor 45
- PM Software Monitor 56
- Copy-cat tape decks 94
- Video cameras go underwater 184

## AVIATION

- Skyhooks for Harriers 181
- Big eye in the sky 182

## SHOP AND CRAFTS

- 32, 74, 179 Hints from readers
- 34A The PM Workbench
- 56 Four tool kits that work
- 65 Paint strippers: Beware the hidden hazards
- 69 Build this versatile handcart
- 96 Do beautiful work in tight places with a special tool
- 100 A classic lap desk you can build
- 102 12 tools that'll surprise you

## PHOTOGRAPHY

- 33 Photo Hints
- 86 The long and short of camera lenses

## EVERY MONTH

- 5 Editor's Notes
- 6 Letters to the Editor
- 181 Technology Update

## WORTH WRITING FOR

- 139 Looking for more ideas and information

POPULAR MECHANICS (ISSN 0032-4558) is published monthly by The Hearst Corporation, 224 West 57th Street, New York, N.Y. 10019, U.S.A. Subscription prices: United States and possessions, \$11.97 for one year, \$21.97 for two years. Canada and all other countries, add \$16.00 for each year. Second-class postage paid at New York, N.Y. and additional mailing offices. Authorized as second-class mail by the Post Office Department, Ottawa and for payment of postage in cash. Registered as second-class matter at the Post Office at Mexico D.F., Mexico, June 20, 1950. © 1983 by The Hearst Corporation. All rights reserved. Printed in U.S.A. POSTMASTER: Please send address changes to Popular Mechanics, P.O. Box 10064, Des Moines, Iowa 50350.

SUBSCRIPTION SERVICE: Popular Mechanics Magazine will, upon receipt from its reader of a complete new or renewal subscription order, undertake fulfillment of that order so as to provide the first-copy delivery either to the Postal Service or alternate carriers within six to twelve weeks. If for some reason this cannot be done, you will be promptly notified of the issue date that will begin your subscription, with a request for any further instructions you may have concerning your order. Please address all such orders to us at Popular Mechanics, P.O. Box 10064, Des Moines, Iowa 50350. • Should you have any problem with your subscription, please write Joan Harris, Customer Service Department, Popular Mechanics, P.O. Box 10064, Des Moines, Iowa 50350. To assure quickest service, please enclose your mailing label when writing to us or renewing your subscription. • Renewal orders must be received at least eight weeks prior to expiration to assure continued service.

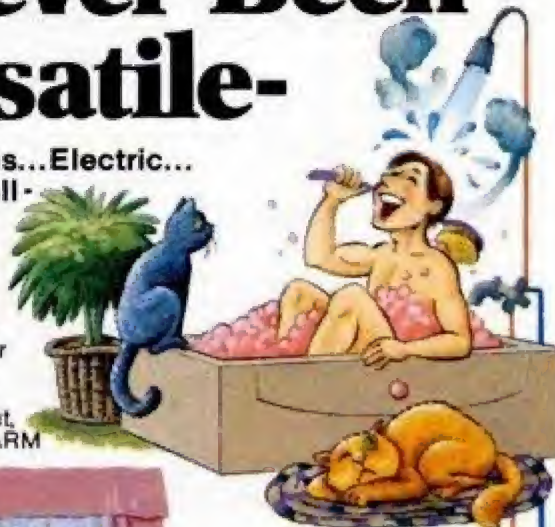
Use this address for subscription orders & inquiries. POPULAR MECHANICS, P.O. Box 10064 Des Moines, Iowa 50350. POSTMASTER: Please send address changes to this address.



# Central Heating Has Never Been So Versatile-

**Wood...Coal...Oil...Gas...Electric...  
HS TARM Burns 'em all -  
Efficiently!**

**Save Money in Comfort**  
Enjoy all the comfort and convenience of hot-water central heat and save money by burning wood or coal! Your HS TARM does it all in one compact, efficient unit. When your wood or coal fire dies out, or when you go away, your TARM switches automatically to operation on oil, gas or electricity.



**Clean and Safe**  
Fuel and ash stay in the basement, where they belong. Your home stays clean and your family and pets safe from high surface temperatures common in ordinary wood and coal stoves.

## Instant Hot Water - Economically!

Your TARM not only heats your entire house, it gives you oceans of hot water for kitchen, bath or laundry - all from the fuel of your choice.

**Ends Fuel Price and Supply Worries**  
Your TARM is a "heating insurance policy" against fuel shortages that can leave your family without heat - and high fuel prices that can empty your pockets. And your HS TARM burns all fuels efficiently - so you save money even when burning oil or gas!

**HS TARM**  
Conway, MA 01341

Call or Write

**800-628-9327**  
-800-282-7719

**YES! Tell me how I can save on fuel and get a fast 1 to 3 year payback when I install an HS TARM.**

- ☐ I'm building a new home or replacing an existing boiler.
- ☐ I'm interested in converting my present system to wood or coal burning.

Name \_\_\_\_\_ City \_\_\_\_\_  
Address \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_ Phone \_\_\_\_\_

**SEND TO: HS TARM/TEKTON, Box 9834, CONWAY, MA 01341**

## Popular Mechanics

**Editor-in-Chief:** John A. Linkletter  
**Executive Editor:** Joe Oldham  
**Managing Editor:** Bill Hartford  
**Graphics Director:** Bryan Canniff

**Special Editorial Features:** Sheldon M. Gallager, editor  
**Automotive:** Wade A. Hoyt, SAE, editor; Michael Lamm (West Coast); Daniel Charles Ross (Detroit)  
**Home and Shop:** Harry Wicks, editor; Penelope Spangler, Michael Chotiner, Joseph Truini, assistants  
**Boating, Outdoors and Travel:** Ray Hill, editor  
**Electronics:** Neil L. Shapiro, editor  
**Science:** Dennis Eskow, editor  
**Editorial Production:** Peter Easton, chief; John Bostonian Jr., art; Peter Francesconi, John Ginsberg, assistants  
**Design Director:** Ira Herrick  
**Art:** Don Mannes, technical art director; Douglas Quinn, Alan Andersen, assistants

**Special Publications:** Clifford B. Hicks

**Editorial offices:** 224 West 57th St., New York, N.Y. 10019. We cannot be responsible for loss of unsolicited queries, manuscripts, or photos. For return, they must be accompanied by adequate postage.

**Reader Service Department:** Hilde vonThorak, director; 224 West 57th St., New York, N.Y. 10019; (212) 262-4292

**Advertising Director:** Gil Alfano

### Advertising Offices:

**New York:** 224 West 57th St., New York, N.Y. 10019; (212) 262-8824  
**Chicago:** 520 North Michigan Ave., Chicago, Ill. 60611; (312) 527-2400  
**Detroit:** 377 Fisher Rd., Grosse Pointe, Mich. 48230; (313) 881-3520  
**Cleveland:** PDC Building, 3659 Green Rd., Cleveland, Ohio 44122; (216) 292-7334  
**Los Angeles:** 460 East Carson Plaza Dr., Carson, Calif. 90746; (213) 532-8101

**Production Manager:** Ronald Tuosto

**Advertising Production:** Patricia Woods; (212) 262-4800

**Classified Sales Manager:** Sophie Gronowicz; (212) 262-4825

Published by The Hearst Corporation

**President:** Frank A. Bennack Jr.

**Chairman:** Randolph A. Hearst

**President, Magazines Division:** Gilbert C. Maurer

**Publisher, Popular Mechanics:** Daniel J. Coleman

**Publishing Consultant:** Richard E. Deems

POPULAR MECHANICS IS PUBLISHED MONTHLY by the Hearst Corporation, 959 Eighth Avenue, New York, N.Y. 10019, U.S.A. Frank A. Bennack Jr., President; Randolph A. Hearst, Chairman; Harrison A. Menick, Vice President and Treasurer; Harvey L. Lipton, Vice President and Secretary; Hearst Magazines Division: Gilbert C. Maurer, President; K. Robert Brink, Executive Vice President and General Manager; Raymond J. Petersen, Executive Vice President; Thomas J. Hughes, Vice President and Resident Controller; William S. Campbell, Vice President, Director of Circulation; Daniel J. Coleman, Vice President for Popular Mechanics.

AS A SERVICE TO READERS, Popular Mechanics publishes newsworthy products, techniques and scientific and technological developments. Due to possible variance in the quality and condition of materials and workmanship, Popular Mechanics cannot assume responsibility for proper application of techniques or proper and safe functioning of manufactured products or reader-built projects resulting from plans published in this magazine.





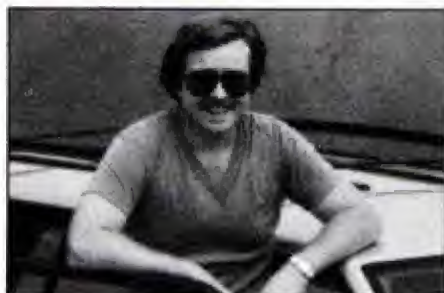
# EDITOR'S NOTES

**C**onsider the year 2008. Seems awfully remote, doesn't it? Yet it's no further in the future than 1983 was when the National Aeronautics and Space Administration (NASA) was founded 25 years ago.

Who could have predicted then, with confidence, that America would have accomplished as much as it has in the ensuing 25 years . . . men on the moon . . . space shuttles . . . photos from the edge of our solar system?

It's not difficult, therefore, to believe James Beggs, NASA Administrator, when he writes on page 85: "By the year 2008, we'll have established a permanent space station orbiting the moon." And that's just one of the space spectaculars NASA has in mind. Mr. Beggs' predictions are part of our celebration of American space achievements that begins on page 81. . . . **Speaking of NASA,** that amphibious firefighter in Miami (page 93 and the cover) owes much of its water-pumping ability to the space agency. The pumps in Miami's seagoing fire engine are based on the design of the fuel pumps in a Saturn V Rocket. . . . **You'll see two new names** on this month's masthead. They're both in the Automotive Department, and they're both names you'll be seeing a lot of in the future. Wade A. Hoyt is heading up the Auto Department and will be based in New York. Daniel Charles Ross becomes our man in Detroit.

Wade, a member of the Society of Automotive Engineers, has been associated with magazines for many years. Most recently, he was senior editor of Reader's Digest General Books, where he directed publication of the Digest's Complete Car Care Manual. Daniel comes to us after staff duty with AutoWeek, preceded by a stint as a freelancer. He replaces Gary Witzenburg, who's off to Los Angeles and freelancing. . . . **"Go ahead and hit me,"** challenged Joe Klecko, 269-pound defensive end for the New York Jets. Dennis Eskow, our slightly smaller Science Editor, obligingly (and somewhat rashly, we think) hit him. Dennis admits he would not do it without an invitation. The point of one-sided punching is simply that today's high-tech football armor really does offer the player a good defense against the thunderous collisions on a football field. You'll find a roundup of protective gear in *Dressed To Kill* (page 89).



Hoyt In the Big Apple . . .



. . . Ross In Motown.



"I'm only kidding, Joe."

*John A. Lillenton*

# MAKES THINGS WORK BETTER!

## BELT-EASE® BELT DRESSING

Long lasting, crystal clear, clean belt dressing gives extra traction and life to automotive V-belts and all drive belts on appliances, blowers, snowmobiles, and power equipment. 5.5-oz. aerosol.



## LOCK-EASE® GRAPHITED LOCK FLUID

Keeps all locks working smoothly year 'round. Seals out moisture, protects against freezing and rust. Frees frozen and stuck locks. 3.5-oz. aerosol with snorkel; 3.4 oz. can.

## LITH-EASE® WHITE LITHIUM GREASE

An all weather grease for auto, farm, marine and shop use. Preferred because of its superior film strength plus water and heat resistance. LITH-EASE provides excellent lubrication and rust protection. 16-oz. aerosol; 1-lb. tub; 1¼-oz. tube.



Available wherever fine automotive and hardware products are sold.



American Grease Stick Co.  
Muskegon, Michigan 49443



**Did you know the  
Services have the means  
to teach someone  
still in their teens.**



**Need a trade?  
Looking for a skill?  
They have hundreds  
that'll fit the bill.**



**They'll take you, train you,  
show you the way.  
You'll work hard,  
and get decent pay.**



**ARMY  
NAVY  
AIR FORCE  
MARINES**







**Serving your country  
is a really good start.  
Helping pay for college  
is the Services' part.**



**Future in doubt?  
Well, shed that lead,  
join the Services  
and get ahead.  
In the Army, Navy,  
Air Force, Marines.**

If you're bright enough to graduate from high school and are looking for an opportunity to better yourself—you'll find it in the Army, Navy, Air Force and Marines.

For instance, if you want to become an expert in a highly technical field, the Services are the place to learn. You'll work with some of the latest and most sophisticated equipment available. And your instructors are second to none.

Actually, there are hundreds of valuable career skills you may qualify for. And experience isn't important. If you don't have any, they'll see that you get it. The important thing is—you'll be building for your future.

Interested in education? Whether it's college, vocational or technical training, the Armed Forces can help. There's even a program in which the government contributes money toward your college education after the Service.

And when it comes to benefits—it's tough to beat the Services. Pay is higher than ever—more than \$550 a month to start. And you earn 30 days of vacation each year.

To find out more, see your local Armed Forces recruiter or write Armed Forces Opportunities, P.O. Box C 1776, Huntington Station, N.Y. 11746.

# IT'S A GREAT PLACE TO START



# LETTERS TO THE EDITOR



## Flying saucers—old and new



PM's July '57 cover (left) and a new flying car prototype (right).

I was very interested in Dr. Moller's design for a flying saucer, the XM-5 Commuter (*Technology Update*, page 122, July '83). However, while the craft incorporates several novel features, its concept is definitely not new.

If you look back at your issue for July 1957, you'll find basically the same vehicle displayed on the cover (far left). Hiller's flying car used the same principle of ducted fans to provide lift and propulsion. So, you see, the idea is more than a quarter of a century old.

PAUL BAUGHMAN  
WATERFORD, PA.

*Thanks for the reminder. Unfortunately, the Hiller design was never built, but Dr. Moller already has an operational prototype and appears to be well on his way to producing a commercial version for sale as a kit.*

## Old Jeeps never die

In previewing the new Cherokee and Wagoneer 4wds (*Detroit Listening Post*, page 30, Aug. '83), Gary Witzenburg referred to earlier models as "clunky old Jeep wagons." Them's fightin' words to us country folks.

Maybe he's never had to haul baby calves out of a freezing blizzard in the dead of night or he'd know better. Our "old clunker" has more than 110,000 miles on it and is still going strong. Keep those fancy new five-speed, independent-front-suspension tin cans out of my way, because old clunkers never die—they just pass you.

RUSS WEIDNER  
TRENTON, NEB.

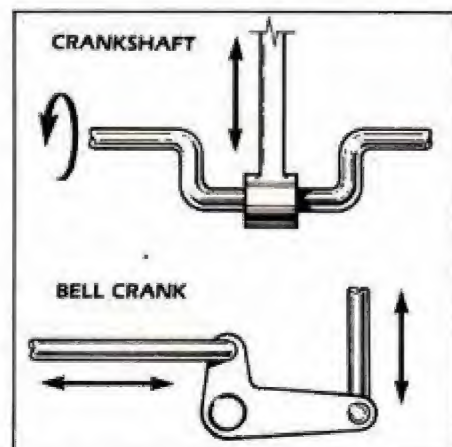
was appalled to see a crankshaft called a bell crank in your otherwise fascinating article *Folk Art That Comes To Life* (page 105, May '83).

A crankshaft converts rotary motion to reciprocating motion or vice versa. A bell crank, on the other hand, converts reciprocating motion in one direction to reciprocating motion in another direction, usually at 90°.

I wouldn't nit-pick this way except that PM is read by thousands of budding young mechanics, engineers and scientists. They shouldn't grow up with a misconception.

ROY MOUNGOVAN  
SEBASTOPOL, CALIF.

*We agree and apologize for the slip-up. The two mechanical linkages, correctly identified, are shown below.*



For the record, a rotary crankshaft (top) versus a right-angle bell crank (bottom).

## Call us British, please

Your exciting story *Falklands Diary Of A Harrier Pilot* (page 59, June '83) was marred only by a small oversight in referring to our gallant fighting men as English, when you should have said British. As a United Kingdom, we're British first, then Scots, English, Welsh and Irish second.

HAMISH PROCTOR  
ELGIN, SCOTLAND

## Tale of two cranks

When I was a boy 50-odd years ago, I learned many principles of mechanics and their proper terminology from PM. Your information was invariably accurate and provided a great education for young people like myself. This is why I

## Vintage Vettes are better

I've held my tongue long enough. As the owner of five vintage Corvettes from '63 to '70, I must comment on the latest edition that you praised so highly (*Corvette*, page 84, Mar. '83).

The new Vette is certainly a fine car mechanically, and I wish that some of its features were on my older models. But to call it a beautiful car is stretching wishful thinking just a little more than I can stand.

The '83 Corvette is the blandest-looking set of wheels I've ever seen. Not a single person in our 78-member Corvette Club has bought one. Does that tell you something?

CARROLL SHELDON  
KEARNEY, NEB.

## Make-believe mix-up

I agree wholeheartedly with Neil Shapiro's glowing praise for Microsoft's new *Flight Simulator* program for the IBM Personal Computer (*PM Software Monitor*, page 61, July '83). But how on earth did he manage to put the John Hancock building in Boston?

I have the same program and the building was in Chicago the last time I looked. Have they moved it?

MATT SWAFFORD  
KANSAS CITY, MO.

*No, it's still in Chicago. Neil Shapiro reports he was so shaken after crashing his Cessna into the John Hancock tower that he somehow must have thought he was in Boston.*

PM





# Now America's #1 chain saw comes with yet another feature found on no other saw:



## Free Boots! \$55 Value

Homelite chain saws give you all the performance features and power you need to do the job like a pro. And with our FREE boot offer, you can even dress like one!

**WOLVERINE**  
Boots

When you purchase a Homelite® Super 2, 240, 245, 330 or 410 chain saw between September 1 and December 31, 1983, we'll send you a FREE pair of \$55 Wolverine genuine pigskin leather boots, for just \$3 postage and handling! Your Homelite dealer will give you details, and then he'll show you even more features, to boot.

## Innovation that puts us a cut above the rest.

It's not enough just being the leader in 2-cycle engine technology and pioneer of the modern chain saw. Our latest engineering breakthroughs result in the most advanced performance features imaginable! Features like advanced carburetor design on our updated Model 410, for improved engine idle and acceleration. Extended wear features



that let our new Model 245 go above and beyond the call of medium duty saws! Combine that with features like vibration isolation for more control and less fatigue, and you've got the best selling line of chain saws in America today!

## We're America's #1 chain saw because safety is our #1 priority.

Homelite chain saws continue to set an example for the industry, with safety features unheard of on other saws. Our exclusive SAFE-T-TIP® anti-kickback device totally eliminates kickback by preventing the nose of the guide bar from striking a solid object. And our Raker III™ Kickback Suppression Chain reduces kickback intensity by as much as 75% compared to conventional non-safety saw chains.



With so many features, you've got all the right reasons for walking away with a brand new Homelite chain saw. And with our FREE boot offer, you'll even get something to walk away in!

See your Homelite dealer for "FREE BOOT" details.

**NOBODY DOES THE JOB  
AROUND THE  
HOME OR FARM LIKE  
HOMELITE/JACOBSEN.**

**HOMELITE  
JACOBSEN**

**HOMELITE TEXTRON**  
Homelite Division of Textron Inc.



# IMPORTS & MOTORSPORTS



## A harmony of sports cars



Who doesn't drool at the sight of a perfectly restored MG TD out for its Sunday drive? That's when you might be tempted to wonder, "Whatever happened to the sports car?" One theory is that sometime in the '60s it became a motorcycle: wind-in-the-face fun, except on a bike your passenger sits *behind* you.

The ragtop roadster is gone—trusting that you don't confuse a K-car convertible (as nice as it is) with an Austin-Healy 3000 Mk III!—and side curtains have flapped their last. But the new sports cars do have a music

**Toyota** two-seater will become another link in sports car evolution next year.

### Isuzu

We recently let our fingers do the driving, tapping out commands on the satellite control pod of the new Impulse. We'll have a full test next month. It's available in 30 states from 200 dealers and worth crossing state lines for. And at \$10,000, what a deal!

### Toyota

The twin-cam Supra is the hot one right now, but Toyota's got a smaller-scale, two-seater in the works. Security's tight, but our sneak shot is seen above.

### Mazda

The RX-7's clean styling, excellent performance and reasonable price are still its strengths. Sheet metal is the same for '84, but more power will be on tap from its rotary engine.

### Mitsubishi

The turbo Starion gets needed front-end cleanup. The smoother hood line will also be found at Chrysler dealers, who will soon be selling the Starion with a Conquest nameplate.

### Honda

The second-generation Prelude, having grown a bit longer in its transformation into a totally integrated and great-looking design, leaves Honda with a slot for a small, sporty car. They'll be filling it with a sports coupe variation of the Civic coded CR-X. Pics to come.

### Nissan

The Pulsar sports coupe now has tur-



**Hotter-than-stock Honda Prelude** got the hop-up treatment at A/T Engineering.



**Isuzu Impulse** styling turns every head and satellite pod controls delight all fingers.

of their own. They reflect a harmony of influences: roadsters at heart (even though they're closed up into "sports coupes"), with back-seat passengers getting the squeeze, if there is a back seat; under-the-hood hop-up by turbos and hot-rod valves; suspensions and muscle-car bodywork from track and wind tunnel; and all the power options—even cruise control—formerly found only on "luxury" cars. They're almost exclusively from Japanese automakers.

Here's a look at the latest entries in the field.



**Design study of the Nissan 300ZX:** PM's road test of the luxury sports car is next month.





# PLAYERS GO PLACES

Meet Players.

Regular and Menthol  
Kings and 100's.



Kings: 12 mg "tar," 1.0 mg nicotine—100's: 14 mg "tar,"  
1.1 mg nicotine av. per cigarette, by FTC method.

Warning: The Surgeon General Has Determined  
That Cigarette Smoking Is Dangerous to Your Health.



# ALL OUTDOORS



## Kevlar—canoes are made from it, too

Kevlar—that miracle material used in everything from bulletproof vests to motorcycle helmets—has now found its way into canoes. I had a chance recently to try out some of the new Kevlar canoes. Here's what I found:

A Kevlar canoe is much lighter than an aluminum one. A 17-foot aluminum canoe might weigh about 80 pounds. A 17-foot Kevlar canoe weighs 32 to 60 pounds, depending on its use. For racing it might be 32 pounds, for flat-water use, 40 to 50, and for white-water running, 60.

Getting rid of those extra pounds isn't cheap, though. The price of a 17-foot Kevlar canoe might be \$1,300. A

comparable aluminum canoe might cost only \$550.

Kevlar canoes are great when you have to do a lot of portaging. Of course, if Kevlar's high price tag discourages you, there are plenty of fiberglass canoes available. A fiberglass canoe is heavier than a Kevlar model, but might be lighter than a comparable aluminum canoe. A 17-foot canoe made of fiberglass might weigh 70 pounds and cost \$750.

Another advantage Kevlar and fiberglass canoes have over their aluminum brethren is that they can be repaired. Put a hole in an aluminum hull and you've got problems. Do the same thing to a fiberglass or Kevlar job, and you just repair it using normal fiberglass repair techniques (with Kevlar you use Kevlar cloth instead of a fiberglass cloth).

How do canoes made of synthetic materials perform in the water? Very well. I paddled several new models and found them to be responsive, durable and lightweight.

Still, a canoe made of a high-tech synthetic material may not be for you. The extra weight savings gained with a canoe made of Kevlar may not be important if you don't do any portaging. And a good aluminum canoe is durable. You have to whack it pretty good with a rock to put a hole in it.

But if light weight and ease of repair are important, then your choice is clear: Get a high-tech synthetic.



Mad River's 13-foot Compatriot is made of Kevlar and weighs in at 33 pounds. The craft is camouflaged, and it's a great solo flat-water canoe.

## Camping is popular

Camping continues to be one of America's favorite sporting activities. Approximately 60 million Americans camped last year. By 1985, that number will increase to 61.6 million. And by 1990 it will swell to 64.4 million.

These are some of the interesting figures reported in a new study done by the A.C. Nielsen Co.

Camping exceeds these sports in

popularity: bowling, boating, jogging, softball, tennis, skiing, hunting, golf, soccer and billiards.

The study found that the campers break down this way: 44.6 percent are tent campers, 39.1 percent are RV campers and 11.1 percent are backpackers. Or, put another way, about 27 million persons are tent campers, 24 million RV campers and 7 million backpackers.

## Air guns for better shooting



The CO<sub>2</sub> cartridge fits in the handle. Each cartridge is good for 60 shots. Gun breaks open so pellets can be reloaded quickly.

Shooting handguns is a great sport. It's also expensive. Forgetting the initial investment for a gun, the ammo can cost several cents a round—even if you reload it yourself.

Another problem is flinching, something all of us either do or have done. Flinching, of course, is when you jerk the gun as you pull the trigger, in anticipation of the pistol's recoil.

An air pistol, particularly Crosman's six-shot .357 Colt Magnum replica, is a great way to eliminate both flinching and the high cost of ammo. I've shot several hundred rounds through one of these babies recently. My shooting has improved. And even more importantly, each round costs me only 1½ cents.

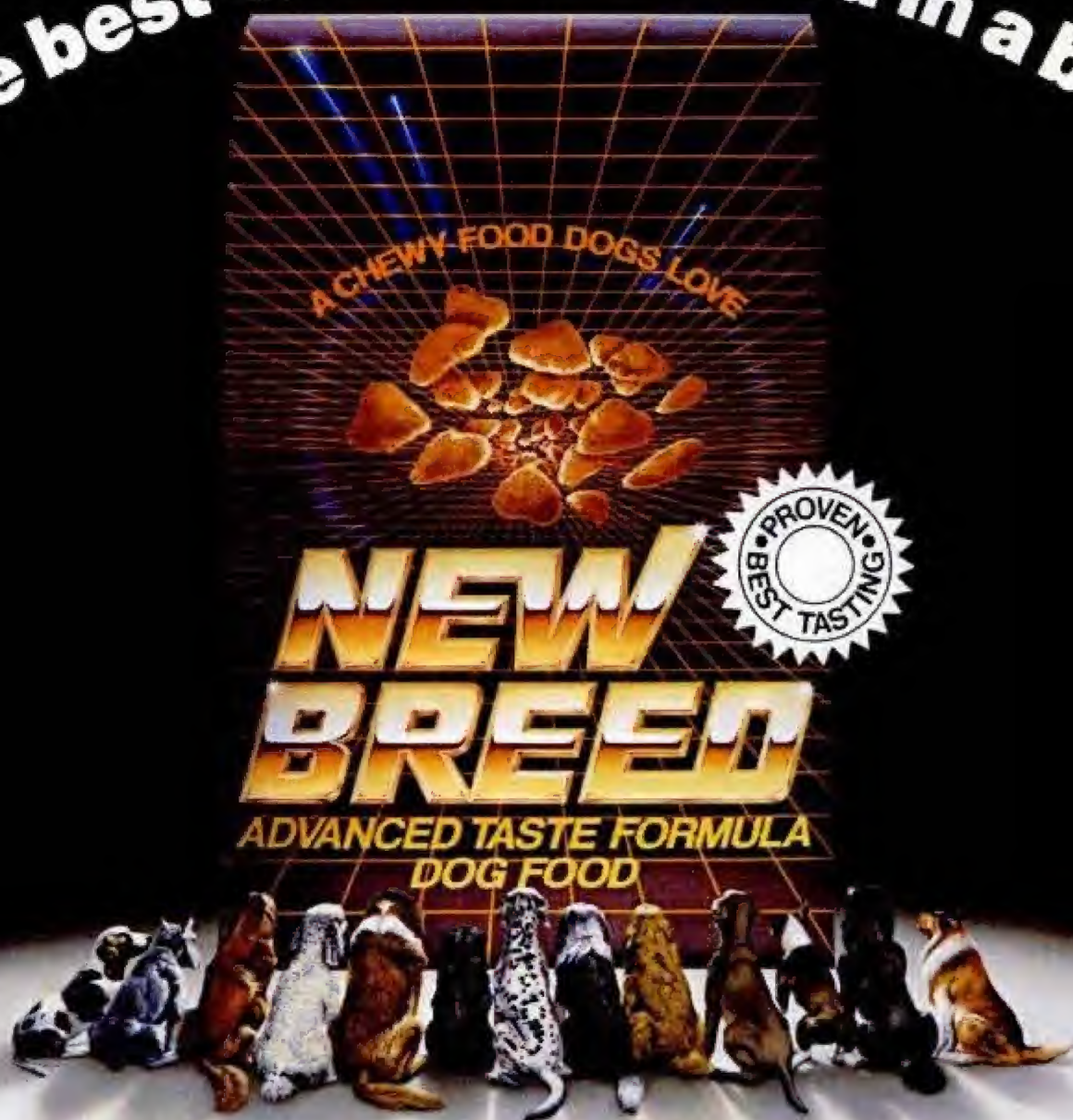
At 25 feet, the .357 replica fires its .177-caliber pellets accurately. An experienced shooter can produce very tight groups. The gun can be fired double or single action. The great thing about this pistol is that you can shoot it in your basement—something family, neighbors and your basement walls would object to with a real .357. A cardboard box filled with wood chips stops the pellets easily. **PM**



An air pistol has no recoil, which means that flinching is eliminated. Crosman's Colt .357 Magnum replica costs about \$50.



**Introducing New Breed.<sup>TM</sup>  
The best-tasting dog food in a bag.**



It's true. Only New Breed<sup>TM</sup> can really say it's the best-tasting dog food in a bag. New Breed can say it because independent tests proved it. In fact, New Breed is preferred to any other dry dog food by 3 out of 4 dogs. So while other dry dog food advertising might imply better taste, if you want the one that's proven best tasting, we've got a whole new breed.



# DETROIT LISTENING POST



## Special Fiero and Corvette

It was at Sears Point Raceway in California that we tested America's first mid-engine sports car, the Pontiac Fiero 2M4. Equipped with the highly recommended WS6 suspension option, it handled Sears Point's tricky hairpins and diving, climbing and flat-out turns with terrific agility. Its only real deficiencies, we found, were the low-revving 2.5-liter engine, one too few ratios (four) in the standard manual gearbox and fairly slow 19:1 steering, all of which are being attended to for future models. It's an impressive new car, but not as exciting as its nonproduction versions.

At the Sears Point introduction, division General Manager Bill Hoglund unveiled a serious-looking Fiero race car and a gorgeous open roadster version. The former is a 280-hp four-cylinder prototype built by Pontiac engineers and indicative of what they hope some independent teams will be racing next year; the latter is a concept car only, and not intended for production. But the roadster gives an idea of what aftermarket firms might do for the Fiero, thanks to its bolt-on body panels. It looked like a ¾-scale Lamborghini!

Another factory racer we saw re-



Recent sneak previews of a mid-engined Corvette prototype racer (top) and a Pontiac Fiero roadster show that Detroit carmakers have rediscovered automotive excitement.

cently is a mid-engined GTP Corvette aimed at IMSA's popular Camel GT series. This screamer combines a race-proven Lola chassis, a smooth-looking

body by GM Design and PPG, plus a Ryan Falconer 3.4-liter turbocharged Chevy V6 that develops 720 hp at 8,500 rpm on gasoline.

## Chrysler news bits

Chrysler is working on extended-wheelbase versions of its soon-to-be-available fwd minivans. The change will provide more cargo room, plus a fold-down rear seat for sleeping and an electrically operated sliding side door.

Another program for '85 is an upmarket fwd luxury coupe, code-named H-car. The vehicle is said to be rounded and highly aerodynamic, sporting Ford T-Bird/Cougar/Tempo/Topaz-style doors that wrap into the roof and an overall shape reminiscent of the beautiful new Audi 5000. (I recently asked a Ford executive whether he thought his company's new "aero" look was catching on with the public. "Yes," he replied with a grin, "and Chrysler's already copying us.")

On the engine front, Chrysler is tooling up a new V6 off its existing 5.2-liter (truck) V8. It's intended primarily for a

new mid-size pickup truck, smaller than conventional pickups but larger than GM/Ford and Japanese mini-trucks. Both vehicle and engine should debut sometime next year, and the engine may find its way into some fwd passenger-car applications in the more distant future.

## GM news

Just when we thought we had GM's many code names down pat, they're going to change the system. The '85 N-body luxury coupes (Grand Prix, Cutlass Supreme, Regal) are now the GM-20; the '86 Eldorado/Riviera/Toronado replacement is GM-30; the '87 Buick and Olds fwd full-size B-body replacement is GM-70; and a combined X-car/A-car replacement program for '87 is GM-10. I give up.

Returning to the present, GM's

much-discussed fwd C-body luxury car replacements (Cadillac de Ville, Buick Park Avenue, Olds 98), originally scheduled for introduction about now, will likely hit the showrooms about four months late, or after the first of the year. "We will release no car before its time," said one GM official, indicating that some further development was necessary.

Oldsmobile Div. is awaiting corporate approval to tool up a new, high-tech double-overhead-cam four-cylinder engine for future small luxury and sporty cars. If it reaches production sometime in 1987, as hoped, it will be the first all-new homebuilt engine from General Motors since the late 1970s.

Finally, everyone knows whitewall tires are passé, old-fashioned and out of style, right? No European carmaker would be caught dead with glitzy

(Please turn to page 16)



# PERFORMANCE.

## YOU'VE GOT OUR WORD ON IT

What do you call a spark plug that gives you all-out performance or your money back?

You call it a Champion Copper Plus.

Because when you install spark plugs embellished with the red letters of Champion, you get the advanced technology of the world's best seller. Plus a 60-day, money-back Performance Guarantee.\*

If you don't agree that your engine runs

better with fresh Champions, just return the plugs to Champion with proof of purchase within 60 days, and we'll give you your money back. No ifs, ands or buts.

So tune up now, during National Car Care Month with performance guaranteed, Champion Copper Plus. It's the best spark plug we've ever made.

You've got our word on it.

## THE CHAMPION GUARANTEE

IF YOU DON'T THINK YOUR  
ENGINE RUNS BETTER WITH FRESH  
CHAMPION SPARK PLUGS, WE  
WILL GIVE YOUR MONEY BACK.

CHAMPION

PERFORMANCE  
GUARANTEED

SPARK PLUGS



**CHAMPION**  
NOTHING SPARKS  
LIKE A CHAMPION



©1983 Champion Spark Plug Company • Toledo, OH 43661

\*Offer expires 12/31/83.



## DETROIT LISTENING POST

(Continued from page 14)

whitewalls, or even sporty white letters on its car's tires, right? Then why are American carmakers so reluctant to give them up? Because a lot of people still like them. But also because GM, for example, averages \$28 extra profit on each whitewall-shod car its dealers sell. That's about \$100 million a year.

### Ford's refreshing spirit

Also at Sears Point was the West Coast press preview for Ford Motor Co.'s

most exciting new '84 products: EXP Turbo, SVO Mustang and Mark VII LSC. President Donald E. Petersen was bubbling with enthusiasm and confidence at the track, where he and a growing number of his top lieutenants recently completed Bob Bondurant's high-performance driving school.

Instead of standing around uncomfortably and fielding occasional questions from the journalists, normally the case at such affairs, the Ford people—Petersen included—were lining up to wheel their cars around the track in between our own test drives. Like us, they couldn't get enough.

At one point late in the day, Petersen asked for one more drive in one of the LSC Marks. The PR-types and engineers who were coordinating the on-track activities said they could probably accommodate him in the next few minutes. "Why not?" one said to the other when the Ford president was out of earshot. "It's his company."

Earlier that day, Petersen had been expounding on his company's philosophy on designing and building its cars for the '80s. He said that from now on, Ford products will be "drivers cars" with outstanding seats and careful attention to seating position relative to the steering wheel and pedals, as well as instrumentation and controls. Interiors would be understated and functional, not "glitzy" as in the past, with large glass areas and an overall feeling of spaciousness.

The guiding emphasis will be on what he called "fundamental product integrity." When making product decisions, he said, "We will ask ourselves, 'Is this really the right way to do it?' " Safety, damageability and solidity of the body/chassis will be paramount, as well as serviceability, Petersen said. "We will have no 2½-mph bumpers," for example.

Transmission gearing will be properly matched to the engine, "the way the driver wants it. We're not going to fall back into the trap of extra-wide gearing just for higher EPA numbers." Another trap he said Ford will keep away from is the use of unnecessary electronic gimmickry. "There will be no more voices in Ford cars."

Petersen emphasized, too, that not all "driver's cars" are performance-oriented. "We will have purpose-developed cars for all types of drivers, not just high-performance enthusiast cars. We'll try to make each car a 'fully specified' product for its intended function."

Of course, he added, the bottom line for any company is to make a profit. "But we're not going to sacrifice quality or integrity to do it. If you put the product first, the profit will come."

Above all, Ford wants a high-technology image and reputation. "We're going to be known as the company that's moving this whole industry the way cars are going to go," the Ford president concluded.

Sincere as all this sounds, can we write it off as more of the same old hype? I don't think so. The new '83 and '84 Ford products we've driven so far, as well as some major changes to existing older ones, definitely reflect this philosophy.

Finally—and I think this applies to most other carmakers as well, not just Ford—deeds are beginning to match words in Detroit. **PM**

## Throw down your guns. Self-propelled Ready to Caulk™ is here.

Introducing Ready to Caulk, the revolutionary new gunless caulking system from DAP. **Easier to use.** Ready to Caulk features a self-propelled delivery system. So you can caulk a smooth, consistent bead in any direction. Without a caulking gun. There's no bubbling or sputtering, use after use. You get the full contents of the can. And clean up with water.

**Indoors and out.** Use Ready to Caulk to seal around windows and doors, siding, countertops, and more. It's moisture and mildew resistant. And sets within two hours for painting.

**Guaranteed for 20 years.** Ready to Caulk contains our top-quality Acrylic Latex Caulk with Silicone. In fact, it's guaranteed not to crack, peel, or separate for 20 years. So for your next caulking job, reach for Ready to Caulk. From DAP.

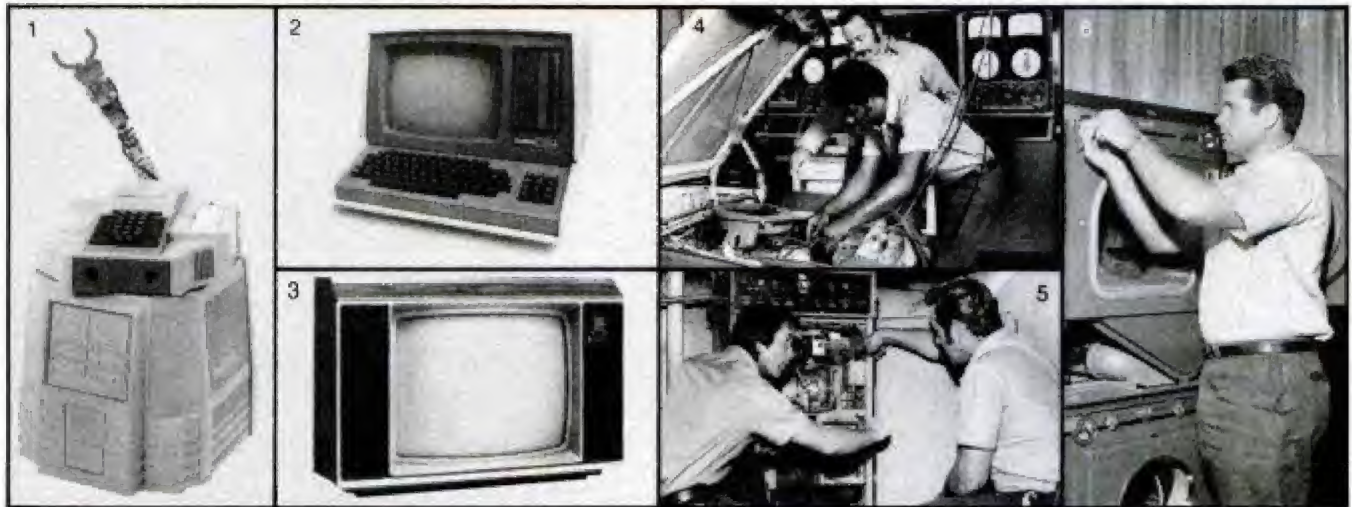


Depend on what the pros use most.

© 1983 DAP, Inc.



# NTS Home Training...KEEPING PACE WITH TOMORROW'S TECHNOLOGY



**NTS invites you to explore the world of technology with these training programs in many fields. Courses include state-of-the-art equipment, and lesson-texts to make your hands-on training exciting and down-to-earth practical.**

**1. HERO 1.** This remarkable computer-controlled robot is included in two courses. Learn Robotic Fundamentals, Electrical, Pneumatic and Hydraulic power as well as Servomechanisms, Speech Synthesis, and Robotic Programming. Hero 1 is complete with arm, gripper, and Speech Synthesis Board. Courses also cover fundamentals of Micro-processor Control, Robotic Programming, and Interfacing.

**2. NTS/HEATH HN89A MICROCOMPUTER,** offered in basic and advanced courses, is a state-of-the-art unit with Floppy Disc Drive, 48K Memory on Board, and other outstanding features. Courses teach troubleshooting skills, understanding of micro-processors, digital systems, and a brief introduction to programming.

*Use the mail-in card or fill out and mail the coupon. Indicate the field of your choice. (One, only please.) FREE full color catalog will be sent to you by return mail.*

**NO OBLIGATION**

**NO SALESMAN WILL CALL**



TECHNICAL TRADE TRAINING SINCE 1905

Resident and Home-Study Schools

4000 So. Figueroa St., Los Angeles, CA 90037

**3. NTS/HEATH TV RECEIVER.** This advanced "Z Chassis" is a "Smart Set" with capabilities beyond anything previously available. It opens a new era in Video set design. Has Quartz Controlled Tuning, 178 Channel Capacity, Remote Antenna Switch Accessory for Cable, Video, Games, and more. Course covers servicing, troubleshooting, Digital and Analog Circuits.

**4. AUTO MECHANICS** is a technical field which requires an increasing knowledge of electrical systems and test equipment. NTS offers three programs with a new selection of tool and test instruments. Learn engine diagnosis, motor overhaul, transmissions, Diesel engines and more.

**5. AIR CONDITIONING, REFRIGERATION, SOLAR HEATING.** Equip yourself for opportunities in this essential industry. Learn servicing of commercial, industrial, and residential heating and cooling equipment. Course includes Hermetic Unit Analyzer, Leak Detector, other valuable tools and test instruments.

**6. HOME APPLIANCES.** Courses cover maintenance and repair of washers, ranges, dryers, and other large and small appliances. Training equipment includes NTS Circuit Trainer, plus a Multimeter and hand tools.

## NATIONAL TECHNICAL SCHOOLS

Dept. 201-103

4000 South Figueroa Street, Los Angeles, CA 90037

Please send FREE color catalog on course checked below:

- |                                                         |                                               |
|---------------------------------------------------------|-----------------------------------------------|
| <input type="checkbox"/> Robotics                       | <input type="checkbox"/> Computer Electronics |
| <input type="checkbox"/> Digital Electronics            | <input type="checkbox"/> Video Technology     |
| <input type="checkbox"/> Auto Mechanics                 | <input type="checkbox"/> Home Appliances      |
| <input type="checkbox"/> Air Conditioning/Solar Heating |                                               |

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

Apt \_\_\_\_\_ City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

☐ Check if interested in G.I. information.

☐ Check if interested ONLY in classroom training in Los Angeles



# CAR CLINIC



## Needed: A nose job

Can you explain why the automatic transmission in my 1980 Pontiac Phoenix, which has a 2.5-liter engine, spits out fluid through the overflow when I start the car in my driveway? It loses about a quart a month.

The driveway is steeply sloped, and the loss occurs when the nose of the car faces up. If I park so the nose of the car faces down or on any level surface, it doesn't happen. The dealer and GM regional office offer no solution. Can you?—John Schoonhoven, Kentville, Nova Scotia

Sure can. Because of an incorrectly designed manual valve, some 1980-82 125C automatic transmissions have had a problem with fluid foaming. The condition usually manifests itself as an incorrect (high) indication on the transmission dipstick, but in a parking situation such as yours it may also result in fluid loss.

The solution to your car's problem is to replace the manual valve and auxiliary valve body cover with ones having GM part numbers 8643316 and 8643326, respectively.

## Encore

My problem is with a 1980 Chevrolet Monza (2.5-liter engine). At 18,000 miles, the engine developed a loud tapping noise. My mechanic told me it was caused by carbon on the tops of the pistons. He was obviously correct, because adding a can of GM Top Engine Cleaner helped for six months. Now, the noise is back. I've talked to other GM owners who have the same problem with their 2.5s. Is there a cure?—Tony Wagoner, Gays, Ill.

I've gone over this before (see *Car Clinic*, page 23, July '83), but I'll repeat it because the trouble is widespread. This advice goes for every GM 2.5-liter engine experiencing engine knock: Replace the .040-inch-thick head gasket put in the engine on the production line with one that's .060 inch thick (part No. 10022914).

## Feeling weigh down

In three years (30,000 miles), my 1980 Toyota Corolla station wagon has ruined three sets of front tires—that's a set every 10,000 miles. Only the insides of the tires wear away, but so badly that the belts show through. The outsides remain practically new.

The dealer has aligned the wheels at 10,000, 20,000 and 30,000 miles. He insists that the car is at factory specs, including the riding height, and can't find anything wrong. The wagon is used locally and is never overloaded.—John Guggino, Spring Valley, N.Y.

You say the wagon is "never over-

loaded," which suggests to me that some weight is put in it. When a load is carried in the Corolla wagon, even if it's not excessive, the front of the vehicle is raised and gives an increase in the front riding height. This leads to a toe-out of the front wheels, which can result in severe inner tire wear.

Place a load in the wagon that approximates the weight you normally carry and then have front wheels aligned to the limits of the specification. By this I mean that with belted-bias tires, have toe-in set at 4 mm, since the spec calls for a toe-in of  $3 \pm 1$  mm. With radial tires the spec is  $1 \pm 1$  mm, so have toe-in set at 2mm.

## Not so 'Vonderful'

My 1982 Ford LTD equipped with the 5.0-liter engine and three other LTDs (two '80s and an '81) I know about in this town have common problems no one has been able to solve. The most serious trouble is an almost-stall when slowing down. The other problems are black exhaust smoke and poor fuel mileage. So far, the dealer has blamed the exhaust-gas recirculation system, incorrect timing and low rpm. Now, he says nothing can be done, that this is the way the car works.—Clifford Grimes, Flushing, Ohio

Your car and those of the other LTD owners are equipped with variable venturi (VV) carburetors. The VV carburetor automatically varies the area of its venturi according to engine speed and load, which makes it a different animal from conventional venturi carburetors with fixed areas. The VV carburetor has a dual-element valve which moves in and out according to the amount of air flowing into the carburetor throat. This valve is controlled by engine vacuum and throttle position. It's connected to two metering rods which control fuel flow.

In theory, the VV carburetor is supposed to maintain a fairly constant air speed, keeping the air/fuel mixture more or less in balance at all throttle openings without the need for an idling

(Please turn to page 22)

**PM CAR CARE**

**TIP**

**Tread wear**

Uniroyal Tire Co. has come out with some interesting observations concerning tire tread wear on front-wheel-drive cars. Although front tires wear more quickly than rear tires, Uniroyal has found that, on average, there's no difference in the overall tread wear of fwd cars in comparison to rear-wheel-drive cars when tires are rotated on time and properly.

By "on time," Uniroyal means every 6,000 to 8,000 miles. "Properly" means, surprisingly enough, in the same "X" pattern you would use for rotating bias-ply tires. Uniroyal has found no basis for the widely accepted contention that radials should be rotated only front to rear on the same side of the car.

**THE 'X' WAY TO ROTATE**



# Only one anti-freeze formulation is approved by GM, Ford, Chrysler & AMC/Jeep/Renault...

Only one anti-freeze formulation has met the tough standards of all four major car makers. Only one formulation has won their unqualified approval for safe and effective use in all their cars. That formulation contains a high performance corrosion inhibitor system called ALUGARD™ 340-2...and you'll find it in a number of major anti-freeze/coolant brands this year.

All the major car makers have raised their anti-freeze performance requirements significantly, because today's cars run hotter, and because of the potential serious engine and cooling system damage that can be caused by overheating. Anti-freeze/coolants that you've used in the past, simply aren't good enough today.

If you care about your car and want to minimize costly problems, look for and use brands that contain ALUGARD™ 340-2. They're recommended for all new and older cars, including imports.

**BASF**



**Look for the ALUGARD™ 340-2 Symbol on the jug label.**



**THE ANTI-FREEZE FORMULA APPROVED BY GM, FORD, CHRYSLER & AMC.**

**NO OTHER ANTI-FREEZE GIVES YOUR ENGINE & COOLING SYSTEM MORE OVERALL PROTECTION.**



## CAR CLINIC

(Continued from page 20)

system, enrichment-valve system and choke plate. The VV carburetor, which possesses none of these parts, is supposed to provide better fuel economy than fixed-venturi carbs in comparably sized engines. However, the VV has had its share of problems that have resulted in a number of service instructions from Ford to its dealers. Before I list the numbers of these service articles so you can advise your dealer, I want to make these other points:

First, the chief problem with the VV carburetor has been a tendency for the metering rods to get dirty and stick, which causes an overly rich fuel condition that results in the problems you mention. The only solution for this is to disassemble the carburetor and clean the rods, reassemble the carburetor and hope dirt doesn't again clog the works. This will have to be done if the procedures described in the service instructions don't work.

Second, there are two VV carbs—a Model 2700 and a Model 7200. The two are virtually the same, except that the 7200 has the feedback system tied into it—that is, the engine and carburetor are computer-controlled.

The service instructions are as fol-

lows (they apply to both the 2700 and 7200 unless noted otherwise): 80-12-23, 80-24-10 (7200 VV only), 81-9-10, 81-10-28, 81-11-8, 81-11-24 (7200 VV only), 81-15-16, 81-22-7 (7200 VV on the 5.8-liter engine) and 82-11-4 (7200 VV on the 5.8-liter engine).

## Intoxicated

*My car, a 1983 Plymouth Reliant with a 2.2-liter engine, has a bad hesitation*

*when the engine is hot, shut off for 15 minutes or so, then restarted. The car just doesn't go unless I let it idle for about 30 seconds. The dealer tells me all Chrysler cars with 2.2-liter engines are like this and the company is working on a solution. Is he giving me a load of baloney?—Steve Memmer, no address given*

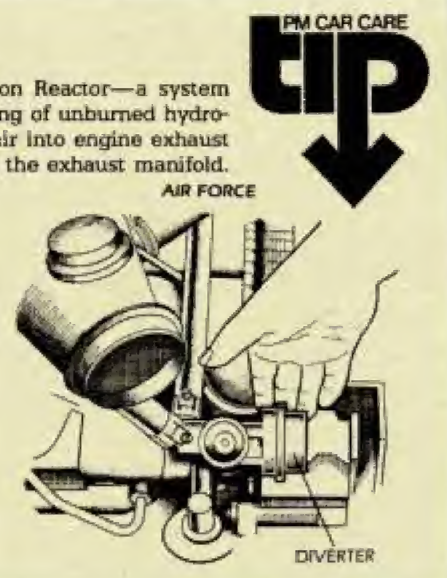
No baloney, Steve. A Chrysler engineer tells me this is a problem in cars that have confined engine compart-

## Trouble in the AIR

Remember AIR? It stands for Air Injection Reactor—a system used on many cars to reduce the outpouring of unburned hydrocarbons and carbon monoxide. It injects air into engine exhaust ports so oxidation of gases takes place in the exhaust manifold. AIR also helps catalytic converters to function more effectively.

Well, a friend's car recently failed a New Jersey emissions inspection. He consequently spent \$65 for unnecessary service, because the car flunked re-examination. It turned out that the trouble was an inoperative AIR system.

How did I find out? Simply by letting the engine idle and feeling for air puffs at the diverter valve. Then, momentarily accelerating the engine and again feeling for air as it returned to idle. Air should be felt both times. If not, the AIR system needs fixing.



# \$1000 A Month With Just A Hack Saw!

© Philip E. Brancato Sr. 1982

Yes, you can make \$1000 a month and more with just a hack saw in your spare time.

## Will I Get Rich?

No, you will not get rich, but you can make over \$1000 a month in your spare time and have a ball doing it.

I tried all those "Get Rich" gimmicks that are advertised, that never tell you anything until you've sent them your \$25, and then you find out their gimmicks were not for you. Well, I've tried them all and I'm still not rich.

All I ever wanted was something I could do in my spare time with my hands, make a little money and enjoy myself and not have to buy \$3000 worth of tools or merchandise to do it.

## Believe It Or Not

I found the most enjoyable and profitable business working with my hands and the only tools I use are a hack saw and measuring tape. The really nice thing about it is any man, woman or ten-year-old can do it.

## What Do I Do?

I make beautiful indoor/outdoor P.V.C. pipe furniture. Such as chairs, lounges, tables, swings, and all kinds of baby furniture out of P.V.C. pipe; even birdhouses and feeders. P.V.C. pipe furniture is the hottest selling furniture on the market today, because it is unique and beautiful and will not rot or rust and it will virtually last a life time.

## Profit Unbelievable!

The fantastic part of this business is the profit.



Just go look at some of this furniture in the stores and see some of the unbelievable prices it is selling for.

A chaise lounge that costs \$62.25 in material and three

hours of work is selling for over \$228 in the stores. I can sell my chaise lounge for anything I think my labor is worth. For once, the big manufacturing companies cannot compete with me or you on prices. You will find you will have more orders than you want!

## Where can you buy the P.V.C. Pipe?

You can buy the P.V.C. pipe from any local hardware store to start. Plus I will supply you with the names and addresses of cushions and pipe manufacturers who will sell to you wholesale, plus I will supply you with my shop manual and six detailed shop drawings with pictures and measurements of six different designs.

## Do you need my shop drawings?

No, you don't need my shop drawings unless you want to save hundreds of hours of trial and error work and thousands of dollars that I had to spend before I finally

found the right design and measurements and tricks to the manufacturing of P.V.C. pipe furniture. I only wish that when I started, I could have bought these shop drawings and I would have gladly paid \$100 for just one of them.

## I will pay you!

Yes, I will pay you \$25 for any unique design shop drawing that I can use in my collection and workshop manual.

## How do you start?

1) Decide if you like to work with your hands to create things and want to make money.

2) Can you afford \$12.00 for my shop manual and six drawings.

3) Send me your name and address along with your check for \$12.00 to:

Philip E. Brancato Sr.  
P. O. Box 237 P5  
Riverview, Florida 33569  
(813) 677-6948

Please allow about two weeks for delivery.



# Your home workshop

## 3-in-1 Power Tool!

This one power-fed tool —

**SAWS** to desired Width...

**PLANES** to desired Thickness...

**MOLDS** all popular Patterns...

— all in one fast operation!

Only Complete Workshop Tool Of Its Kind In The World!

From the day it arrives the Planer/Molder/Saw will make and save you money. With shortages and inflation driving lumber prices skyhigh, this versatile power tool quickly pays for itself by easily converting low cost rough lumber into high value finished stock. Make your own quarter-round, base mold, door and window stop, casing, tongue-and-groove... all popular patterns. Other operators turn out picture frames, fencing, clock cases, furniture, bee hives, bed slats, surveyor's stakes... all kinds of millwork. Handles tough oak and walnut as easily as pine using only one small motor, and so simple to operate even beginners can use it.

**YOUR  
OWN  
BUSINESS  
Part Time  
or Full Time  
Right At  
Home!**

Men and women everywhere are using this one low-cost power-feed machine to start and build their own new businesses... and YOU can do the same. Supply lumberyards, carpenters and contractors in your area with door and window trim... base shoe... bed mold... cove and quarter round... ALL of their trim. You can sell picture frame to custom framing shops, paint stores, department stores and direct to users. All patterns available or design your own.

Get FREE Booklet with facts and full details... **RUSH COUPON TODAY!**



can PAY-OFF....

# ...BIG!

Try The  
Foley-Belsaw In Your  
Own Shop On Our  
**30-DAY FREE  
TRIAL OFFER**  
Mail Coupon Below  
For Complete  
Details!

Send TODAY  
for this  
fact-filled  
**FREE  
BOOKLET!**



### Does The Foley-Belsaw Pay? YOU BET!

#### READ WHAT OWNERS SAY:

"I bought a batch of walnut in the rough, and after planing it on the Foley-Belsaw I figured I saved enough money to pay for two-thirds the cost of the Planer. It really does a good job!"

R.S. Clark — Springfield, Ohio

"This machine pays for itself making money out of scrap boards. It is a very well built machine and I confess it is more than I really expected for the price. It does everything you say it will."

Stephen Schultz — Orangeville, Penna.

"I've been a planer man for years and am now retired. The Foley-Belsaw has earned me \$60,000 in eleven years... it's the best investment I ever made."

Robert Sawyer — Roseburg, Oregon

"I recommend the Foley-Belsaw as the most useful shop tool any craftsman could own. We use one every day in the Workbench model shop... couldn't get along without it."

Jay Hedden, Editor  
Workbench Magazine

There is NO OBLIGATION and  
NO SALESMAN Will Call—ever!

If coupon has been  
removed, just send  
postcard with name  
and address to:

FOLEY-BELSAW CO.  
90310 FIELD BLDG.  
KANSAS CITY, MO. 64111



Foley-Belsaw Co.  
90310 Field Bldg.  
Kansas City, Mo. 64111

**FREE  
BOOK**

☐ YES, please send me the FREE Booklet that gives me complete facts about your Planer-Molder-Saw and full details on how I can qualify for a 30-Day Free Trial right in my own shop. I understand there is No Obligation and that No Salesman will call.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

ments where air circulation is restricted. The trouble is caused by butane in gasoline foaming because of heat and pressure. Foam blocks the carburetor bowl vent, which causes an overpressure in the carburetor bowl. This, in turn, leads to an excessive amount of fuel flow into the engine and the problems associated with overrichness. Butane, incidentally, is an additive oil companies use to increase octane.

You and other owners of Chrysler Corp. cars and light trucks equipped with 2.2-liter engines are in luck, however. Chrysler has just issued an after-run radiator fan system (part No. 4318148). The system allows the radiator fan to run for 10 minutes after the engine is shut off. The wave of cool air reduces engine compartment temperature and prevents fuel foaming.

### On rye or white?

Since it was new, our 1982 Pontiac Grand Prix has had an odor inside the car. The dealer has tried several things to get rid of it, but nothing has worked. Can you help?—R.L. Becker, Boston

In a car, odors often are caused by mildew, which occurs because of a water leak. Washing the interior and spraying with a deodorizer may mask the smell, but won't get rid of it for

long. Mildew is caused by bacteria that thrive in the soft, porous material. Bacteria have to be killed. Shampoo and air spray are ineffective.

The way to get rid of mildew is to first find and seal the water leak. Then, remove seats, carpet and carpet padding, wash the floor pan with a disinfectant and install new carpet padding. Before installing seats and carpet, hire a professional to steam clean all upholstery, including door panels, using industrial upholstery cleaner.

If the odor remains, it means there's still bacteria. At this point, assuming your problem is mildew, the cleaning company should fog the interior with a germicidal chemical.

Suppose the odor isn't mildew, but resembles garbage and is present with the air conditioner on or off. Then, it's possible that something was inadvertently left in an air conditioning duct during production. Maybe someone on the line put down a cheese sandwich and forgot to retrieve it. Whatever—the air conditioning ducts and module should be removed and inspected. **PM**

### DO YOU HAVE A CAR PROBLEM?

Just ask Mort about it. Send your question to the Car Clinic, Popular Mechanics, 224 West 57th St., New York, N.Y. 10019. While letters cannot be answered individually, problems that are of general interest will be discussed in the column.

### SERVICE TIPS

■ A high-pitched whine noticeable only in PARK and NEUTRAL of a 1982-83 GM model with THM 125C automatic transmission may be caused by damaged or worn bearings. Have the following inspected and replaced, if necessary: drive sprocket roller cage bearing (part No. 8631186), driven sprocket roller cage bearing (No. 8631190), drive sprocket thrust bearing (No. 9436851).

■ To check if pinion seals of a power-steering system in a front-wheel-drive model are leaking, Chrysler says to remove the air cleaner, wash down the pinion with carburetor cleaner and let it dry. Then, start the engine, turn the steering wheel from stop to stop two or three times and inspect the pinion for fluid. If there is fluid, a Chrysler Corp. shop can replace seals without removing the rack-and-pinion assembly. Relative data is in bulletin 19-01-83.

■ Suspect carburetor icing if there's a loss of power and stalling in a 1978-80 Ford Fiesta while driving in wet, cold (about 32° F.) weather at highway speeds. The primary cause is an inoperative vacuum motor assembly (part No. D8RZ-9D612-A). Replace it.

■ Is the manual transmission in your 1980-82 Honda Civic hard to shift? Honda has recently issued a new collar/bushing set with control No. 106877.



# SCIENCE WORLDWIDE



## Expanding its scope

America's Space Telescope has passed another construction milestone in preparation for its 1985 launch. The 8-foot-diameter mirror was finished a year ago. The latest landmark was achieved this past summer when the 1,800-pound mirror was mounted to its holding ring. The composite-metal ring has six mounting points for the mirror.

With the mirror in place, the ring will be mounted inside the telescope tube, probably early next year. The Space Telescope will orbit the Earth 320 miles up. Although we've had orbital infrared and X-ray scopes, science hasn't had an above-the-atmosphere view of the stars with a large optical mirror. With the space telescope, astronomers hope to discover new stars and perhaps see planets orbiting some distant stars.



Perkin-Elmer worker watches as Space Telescope mirror is lowered into mounting ring.

## Goodbye, Columbus



Etchings found in West Virginia may have been made by Irish monks before 1492.

Back in the 1970s the discovery of an ancient Viking coin at an Indian campsite gave credence to the theory that Norsemen were on the New England shores centuries before Christopher Columbus "discovered" America.

Now, a Catholic University linguist has translated letters etched in stone inside a West Virginia cave. And Robert Meyers says the discovery may help prove that Irish Catholic monks were in the New World in about 500 A.D., perhaps earlier than the Vikings.

The cave inscription is an image of the sun followed by Celtic Ogam letters that spell out the message "Glad Tidings." The sun image apparently was set there to mark the beginning of the winter solstice.

## Weeding out problems

Herbicides don't have much of an effect on weed populations because the chemicals don't deal with the unwanted plants' prolific seed production, according to a paper presented at a U.S. Department of Agriculture symposium.

To maintain populations, weeds can drop as many as 50 million seeds per acre. Usually, herbicides are applied when only about 10 percent of these seeds have germinated, so most of the seeds are still lying dormant. USDA scientists suggest gardeners let weeds grow wild for a year, allowing more seeds to germinate. That would greatly increase herbicide effectiveness.

## Halley Watch

Amateur astronomers won't start seeing Halley's comet until next year. But the International Halley Watch at NASA's Jet Propulsion Labs wants help with early observational groundwork. This month, on the 21st and 22nd, the continental United States will experience the annual Orionid meteor shower. If you look toward Orion's Belt in the sky just after midnight, you should see meteors streaking to Earth. Dust left by Halley's comet at the turn of the century contributes to the shower.

By counting the number of meteors over a specified period and reporting it to the Halley Watch, you will help scientists determine the current mass of the comet. If you do take a count, send it to me and I'll pass it along to NASA. Also, those readers who want Issue No. 2 of the *Halley Watch Amateur's Bulletin* should send me a self-addressed, stamped envelope marked "Halley."

## Chopping death rates


A report in the *Journal Of The American Medical Assn.* credits helicopters with cutting in half the rate of death due to accidents in Southern California. Citing a study of 300 accidents, the report says that rapid transit to the hospital was a major contributor to the high survival rate. But the study notes that trained physician-nurse teams are usually assigned to medical evacuation helicopters and can do more for a patient than an ambulance attendant.

## Space Shuttle ride

I just received a note from NASA acknowledging my application to be the first journalist on the Space Shuttle in 1984 or '85. Next month, I'll share a list of duties the journalist will perform.

FM



A man is shown from the waist down, wearing a brown leather jacket and blue denim jeans. He is holding a pair of tan work gloves in his right hand, which is raised towards his chest. His left hand is in his back pocket. The background is a solid blue color.

# The Man in the Plain Pockets Jeans

He likes jeans made of tough,  
cotton denim. Jeans that fit right and  
look good, without frills or fancy  
stitching. He's the man who knows  
there's more to quality than an  
inflated price tag. The man in the  
**Plain Pockets™ Jeans**  
only at **JCPenney 15<sup>00</sup>**

Prices higher in Alaska, Hawaii and Puerto Rico.  
©1983, J. C. Penney Company, Inc.

Материал: 100% хлопок. Авторские права.



# APPLIANCE CLINIC



## Overly hot dryer

My J.C. Penney dryer, Model 86147304080, serial No. ZD209560, overheats when the clothes are almost dry. It overheats to the point that the dryer is too hot to touch. As a result, I've ruined two heating elements. I replaced the operating thermostat, but the problem persists.—K.A. Bernard, Carmichael, Calif.

The premature heating element failure and the high temperatures are probably due to insufficient air movement past the heating element, through the drum and out the exhaust. This usually is caused by either a buildup of lint or a restriction in the vent ductwork or in the vent hood.

My suggestion is to give your dryer ductwork a thorough cleaning. Disconnect the ductwork from the back of the dryer. Reach in and remove whatever buildup is visible. Thoroughly clean the inside of all the ductwork leading outdoors with a vacuum cleaner. When you get to the vent hood, pay particular attention to the flapper inside the hood. Make sure it moves freely.

Once the ductwork is cleaned and put back together, move to the front of the dryer. Open the door and remove the lint filter. Thoroughly vacuum the filter housing and ductwork to the blower assembly. The cleaning should remedy your problem.

## Automatic shutoff

Our Lady Kenmore gas dryer, model No. 110-6407922 and serial No. 01563M535, is equipped with an electronic sensor for automatic shutoff. This function has been inoperative for about five years. People at the parts store and I have looked at all of their product pamphlets with no luck in finding a repair. At this time we manually shut off the dryer. Can you help?—Drake Simoff, Southfield, Mich.

Consult a copy of the Sears Kenmore automatic dryer service manual. It's available at all Sears repair parts centers or can be ordered from any Sears store. The part number for the manual is 828693-E (approximate cost is \$6).

The manual will give you a basic knowledge of the operation of your dryer. It was not designed to cover a specific model dryer, but covers, in detail, the repair of most components used in any model. Check pages 30 to 36. I think this information will help you solve your mystery.

## Not defrosting

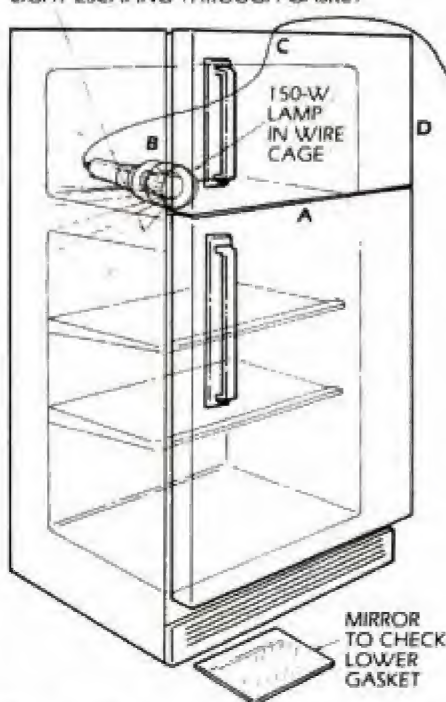
My 7-year-old General Electric cycle defrost TB-14S refrigerator-freezer hasn't been defrosting automatically for the past three years. Frost begins to collect the day after I remove it manually.—Frank Grayeske, Perkiomenville, Pa.

On your model refrigerator, the freezer should be defrosted manually when the frost buildup becomes  $\frac{1}{4}$  to  $\frac{1}{2}$  in. thick in any area of the freezer, or a minimum of once every six months. To defrost properly, keep the unit off a minimum of two hours for an average accumulation of frost.

If the freezer isn't defrosted, frost will build up in the hidden insulation and cause sweating on the outside of the refrigerator. There are only two ways to correct this problem: Either have a serviceman replace the insulation, or turn the refrigerator off for two to four days to let the ice melt. Defrost with the doors open. Use the family picnic cooler to store food while defrosting the refrigerator.

The rapid accumulation of frost in the freezer is due to a door gasket not sealing properly. Check the gasket with a 150-w., wire-caged lamp placed inside the freezer. Don't leave the light in too long, or its heat may damage the plastic freezer interior. Close the door with the light near one side (side B in the drawing) and the cord exiting from the opposite side. Or better yet, use a

LIGHT ESCAPING THROUGH GASKET



Place a 150-w., wire-caged lamp in the freezer. If you see light, there's a poor seal.

battery-powered, cordless light. Examine the door gasket, one side at a time. If the gasket is leaking, you will see light. If the gasket has any visible damage, it will need replacement. Often, incorrect door alignment can cause a poor seal. Releveling the cabinet or adjusting the hinges may help.

## Frost collection

We had a serviceman work on our 7-year-old Frigidaire Custom Imperial FPC1-170T refrigerator-freezer. I asked if he replaced the fan. He said no, adding that ice had collected on the unit until a screw broke, and he merely replaced the screw. The machine seems to be fine. What does the screw do?—Andrew Duchey, Chicago

The screw apparently holds the fan blade to the fan motor shaft.

## SERVICE TIP

Whirlpool has come out with a do-it-yourself dryer repair manual to join the one on repairing Whirlpool automatic washers, which already is available. The new manual has step-by-step instructions and pictures to help you through each repair procedure. It costs \$7.50 through Whirlpool appliance dealers, parts distributors and Tech-Care service companies. Or, send \$8.25 postpaid to: Literature Dept., Whirlpool Parts Distribution Center, La Porte, Ind. 46350. **PM**

If you have a problem with any appliance, send your question, along with the model and serial numbers, to Appliance Clinic, Popular Mechanics, 224 West 57th St., New York, N.Y. 10019. Sorry, but letters cannot be answered individually. Problems of wide interest will be discussed in this column.



# PLAY THE GILLETTE WORLD SERIES BONANZA



**There's a winning entry in every store display.**



## WIN ONE OF THESE PRIZES!

**10 1984 Pontiac Trans Ams,**

TV not included.

**1,000 ATARI Home Computers, or**

**a Gillette Travel Bag (\$15 value).**



600XL is a trademark of Atari, Inc.



In the Gillette World Series Bonanza, every store display has a winning entry. So go to your participating store, look for the display pictured opposite for details, and play! There's no purchase required. (Contest and Refund Offer expires January 31, 1984. Void where prohibited.)

If you cannot find an entry form for the Sweepstakes/\$4 Refund Offer at the store, mail a self-addressed, stamped envelope by November 19, 1983 to:  
Gillette World Series Sweepstakes/\$4 Refund, P.O. Box 2236,  
Boston, MA 02277-2236. ©The Gillette Company, 1983.

## SAVE UP TO \$5.00!

You'll get \$4 back from us just for buying any four of the 11 participating Gillette products. And you'll get *Another Dollar* if you include the *Bonus Dollar Certificate* below. That's a total savings of \$5!



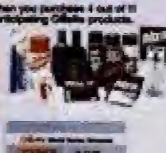
### Gillette World Series Bonanza WIN ONE OF TEN 1984 PONTIAC TRANS Ams



ONE OF 1,000  
ATARI HOME  
COMPUTERS

**SAVE**  
when you purchase 4 out of 11  
participating Gillette products.

ONE OF THESE  
ENTRIES IS A  
**WINNER!**



### BONUS \$\$\$ CERTIFICATE

How to save even more in the Gillette World Series Bonanza: Take this certificate to your participating store, look for the display to the left and play according to the rules; you'll get \$4 refunded from Gillette. Then if you enclose this certificate with your store display refund certificate, we'll send you an additional Bonus Dollar!

**Total Savings With  
This Certificate: \$5.00!**



# HOMEOWNERS' CLINIC



## Finish for concrete floors

*My 20 x 24-ft. concrete garage floor is pockmarked from salts used in our area to combat ice and snow. I'd like to coat the surface with a paint to keep the dust down. How can I get the salt out of the pores, and what kind of paint should I use?—Richard M. Leicht, Rochester, N.Y.*

A call to the Portland Cement Assn. (PCA) gave me the whys and hows. A trip to my Sears store gave me the what and how much.

You should first clean and etch the surface thoroughly. Sears has a cleaner-etcher that sells for about \$7 a

quart and covers about 200 sq. ft. when diluted with three quarts of water. After applying with a sprinkling can, rinse completely with clear water and allow to dry. It's doubtful that any possible remaining salt will be harmful.

Next, you can finish the floor with an acrylic latex porch and floor paint for concrete. Sears' brand sells for about \$18 per gallon and covers up to 450 sq. ft. The directions caution that many tires contain compounds which in combination with the car's weight and the tires' heat may cause the paint to lift off. They suggest that you wait 24

hours before driving on the new paint, then use cardboard under the tire area for two more weeks.

For slightly better results (and more work), PCA suggests an epoxy or polyurethane paint. Once again, Sears sells its product in a pair of half-gallon cans. One is the catalyst, the other is the resin and solvent. This gives a harder finish. However, it also has a high gloss that may be slippery when wet. It sells for about \$32 per gallon. Most paint stores carry similar products. Sears' epoxy is available only through the catalog.

As you work, remember to follow the manufacturer's directions and cautions on the labels.

## Deck moisture

*I have a second-floor deck supported on each end by beams coming through the outside wall. In driving rain, water travels along the beam and leaks into the house.*

*Besides correcting this, how can I seal the top edge of the decking along the wall and expect it to last? Water stands and drips to the underside of the decking. Can I add plastic sheeting and carpet? How can I fasten the plastic and carpet without piercing them?—E.A. Ford, Santa Rosa, Calif.*

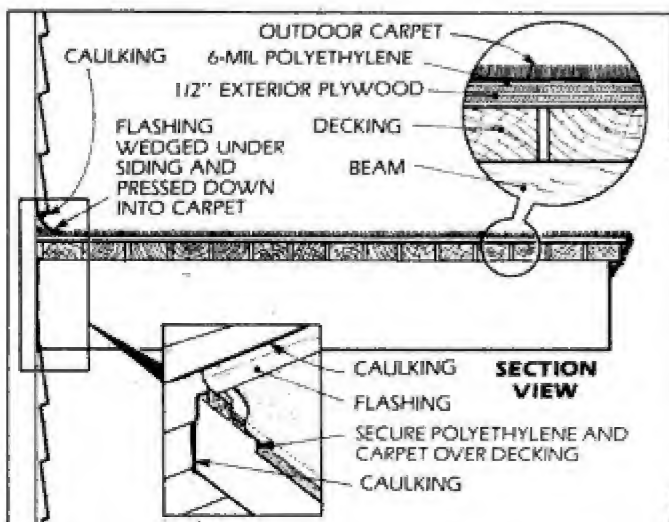
You can thank your architect for building one of the greatest contributors to moisture penetration and wood

rot. From your description, I assume you have a cantilevered balcony. Any movement or traffic on it causes a slight movement at the juncture of the beam entrance through the exterior wall. This can be corrected by caulking with a high-grade silicone caulking, such as that produced by General Electric. The sealant will allow some flexing or movement while still maintaining a watertight seal between the two surfaces.

Your next big problem is the decking itself, which will definitely rot if left as it is (see *Protect Against Rot And Insects With Pressure-Treated Wood*, page 162, Mar. '80). The nails holding the decking to the beams are a perfect "in" for water.

You should flash at the walls after covering the deck. I would cover the decking with exterior-grade plywood, followed by a 6-mil polyethylene vapor barrier and outdoor carpeting.

Nail the cover only under the outside edge and under the flashing. Wrap the plastic and carpet over the plywood and deck edges and secure to the beams (see drawing).



To seal a deck, cover it with exterior plywood, polyethylene sheet and outdoor carpet. Then flash and caulk at the house wall.

## Sliding-door update

A strange thing happened between inception and delivery of the drawing in the July '83 *Homeowners' Clinic* ("Sliding Doors For Closet," page 20). We wanted to show how to frame a door that is located on a bearing wall. The framing process involved adding a header which would be supported at the ends by jack studs. The drawing shows the jack studs bearing directly on the flooring. These studs should bear on the sole plate for proper distribution of the imposed loads.

As shown, the supporting member could be resting on—and deflecting—the plywood subfloor. The nailing between the two studs would then be the only thing keeping the load off the flooring. From a construction standpoint, the sole plate is normally laid out first to assure continuity in the line of the wall. The plate is cut out after the wall and header are framed.

Some framing handbooks show the jack studs resting on the floor, as in our sketch. However, that's for rough openings for doors which are narrower. Most structural engineers and knowledgeable contractors will frame both studs on the sole plate. **PM**

*Do you have a home-maintenance or repair problem? Send it to Homeowners' Clinic, Popular Mechanics, 224 West 57th St., New York, N.Y. 10019. Letters cannot be answered individually, but problems of wide interest will be discussed in the column. For more home-repair and maintenance help, get PM's Home Care Guide, \$4.95 postpaid. Send your order(s) to Popular Mechanics, Box 1014, Radio City Station, New York, N.Y. 10101.*



# Fireside Accessories



## Fire Handler's Gloves

Believe it or not you can actually grab a burning log or rearrange white-hot charcoal with these gloves on and not burn your hands!

They have tough, fire resistant treated leather outers and an extra thick wool lining, yet the fingers are flexible enough to pick up a single briquette easily. The gauntlet cuffs go almost to the elbow so that even your forearms are fully protected. These have the longest cuffs of any gloves we've seen.

Our Fire Handlers have been tested at foundries and out-perform and out-last welding gloves. One size fits all.

5983 - Fire Handler Gloves .....\$29.95



## Fireside Friend

If you split wood, you've gotta have a Fireside Friend. Where an axe or maul is often unwieldy, the Fireside Friend is just the right length (15") and weight (4 lb.) for most kindling work.

The handle can't break, the head won't fly off — they're one piece — forged from hardened steel.

Thick, sole-leather washers are pressed onto the handle, riveted and double lacquered ... handsome and **very** durable.

7153 - Fireside Friend .....\$24.95

## Log Blaster

Multiply your wood-splitting power. You can drive our new log blaster into the heartwood of a green log and it won't get stuck.

It's so effective that a few whacks with a maul explodes the log into quarters, just fireplace-right.

Forged steel, 9" long with an ax sharp edge.

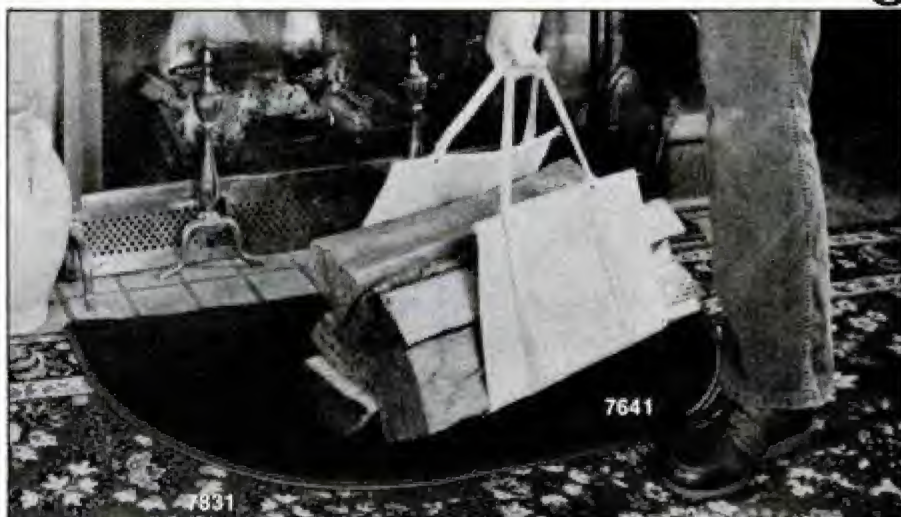
7823 - Log Blaster ..\$19.95

7971 - The Fireside Friend and Log Blaster are naturals together  
**BUY BOTH AND SAVE \$5.00 .....\$39.90**

**OUR GUARANTEE** — If you are not entirely satisfied with any purchase, you may return it within 90 days for a full refund of your purchase price.



Save Time — Order by Phone:  
**TOLL FREE 1-800-321-6840**  
Ohio Residents Call: (216) 831-7645



## Hearth Rug

Why risk ember burns on your expensive carpeting or wood floors when you can cover the danger area with an attractive non-flammable brown thermoglass protective mat? A big 40 x 20". Machine washable.

7831 - Non-Flammable

Hearth Rug .....\$22.95

## Log Tote

Don't scratch your arms or tear your shirt carrying firewood. Use our big, 15 x 48", cowhide tote for lugging logs from the woodpile to the hearth. Stitched and riveted handles for good looks and long life. One trip to the woodpile should do it for the evening.

7641 - Cowhide Log Tote .....\$22.95

9928 - The Hearth Rug and Log Tote are naturals together.

**BUY BOTH AND SAVE \$6.00 .....\$39.90**

**LEICHTUNG**  
"THE Workbench People"

4944 Commerce Pkwy. #1083PM  
Cleveland, OH 44128  
Phone (216) 831-7645

Yes, Ric Leichtung, please send me:

7153 - Fireside Friend(s) @ \$24.95 .....  
7823 - Log Blaster(s) @ \$19.95 .....  
7971 - Friend/Blaster Set(s) @ \$39.90 ..  
5893 - Fire Gloves(s) @ \$29.95 .....  
7831 - Hearth Rug(s) @ \$22.95 .....  
7641 - Log Tote(s) @ \$22.95 .....  
9928 - Rug/Tote Set(s) @ \$39.90 .....

Ohio Residents Add 6 1/2% Tax  
Shipping, Handling and Insurance \$3.00

**TOTAL** .....

### METHOD OF PAYMENT

☐ Check Enclosed ☐ Visa ☐ Mastercard

Card # .....

Good Thru .....

### LEICHTUNG'S 1984 FINE TOOL CATALOG

☐ Enclosed is \$1.00. Please send your full color 1984 catalog of fine tools **PLUS** all catalogs and new tool bulletins **FOR THE NEXT TWO YEARS.**

☐ Send my catalogs **FREE** with my order.

Name .....

Address .....

City .....

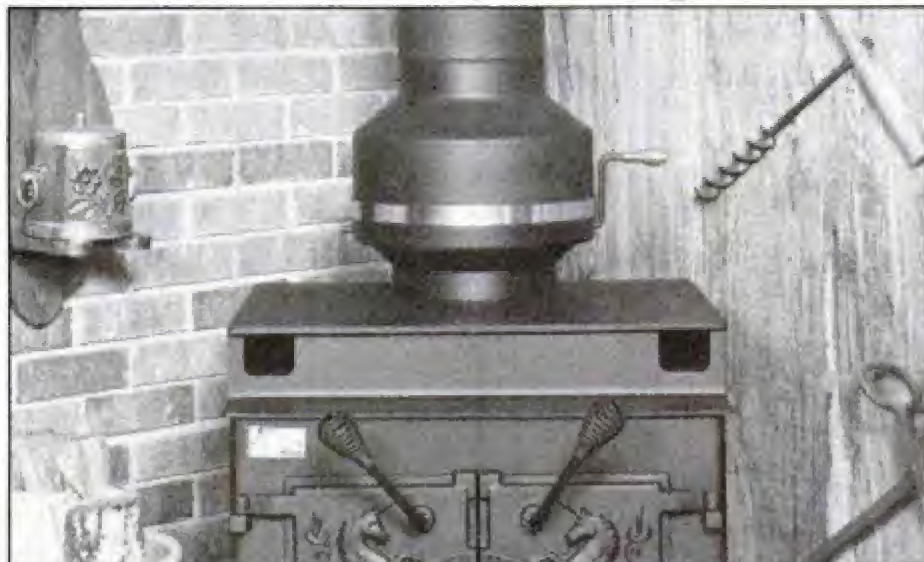
State ..... Zip .....

**LEICHTUNG**  
"THE Workbench People"

4944 Commerce Pkwy. #1083PM  
Cleveland, OH 44128 • Phone (216) 831-7645



### Wood stove converter cuts pollution



The manufacturers of the IN-TEN'SI-FIRE wood stove catalytic combustor (\$199.95) claim dramatically increased burn times, greater heat output and a reduction of creosote and other pollut-

ants to nearly zero. The IN-TEN'SI-FIRE installs directly into the flue of virtually all airtight wood stoves. For further information, contact Catalytic Damper Corp., Conway, Ark. 72032.



### Refillable spray can

Jenni Can is a refillable aerosol can. Add the desired liquid and pressurize, using a bicycle pump or gas station air line. Available in half-pint (\$15.95), pint (\$17.95) and 1 1/2 pint (\$19.95), postpaid. From Unique World Enterprises, Dept. PM, 20 West 485 Ailsworth Ct., Downers Grove, Ill. 60516.



### Quick faucet fix

NIBCO has developed a quick and inexpensive way to fix dripping faucets. Remove the old, damaged cartridge and drop in a replacement (\$1.95). The replacement cartridges repair any of NIBCO's two-handed faucets. They're at plumbing supply stores. By NIBCO Inc., Box 1167, Elkhart, Ind. 46515.



### Bathroom phone ideas

A free bathroom decorating booklet, *Beautiful Bathrooms/Fabulous Phones*, is available from American Bell. Shown here is the Touch-a-matic S telephone with a TeleHelper Speakerphone. For a copy, contact Susan Ames, Bell Home Consultant, Box 2763, Grand Central Station, New York, N.Y. 10017.



### European styling

Excel now offers European-style kitchen cabinets at an economical price. The cabinets, called Alpha, feature flush-mounted melamine laminate doors, oak pulls, all-metal self-closing hinges and ball-bearing drawer slides. For local availability and price information, you should contact Excel Wood Products, One Excel Plaza, Lakewood, N.J. 08701.



### Earth anchor secures small trees

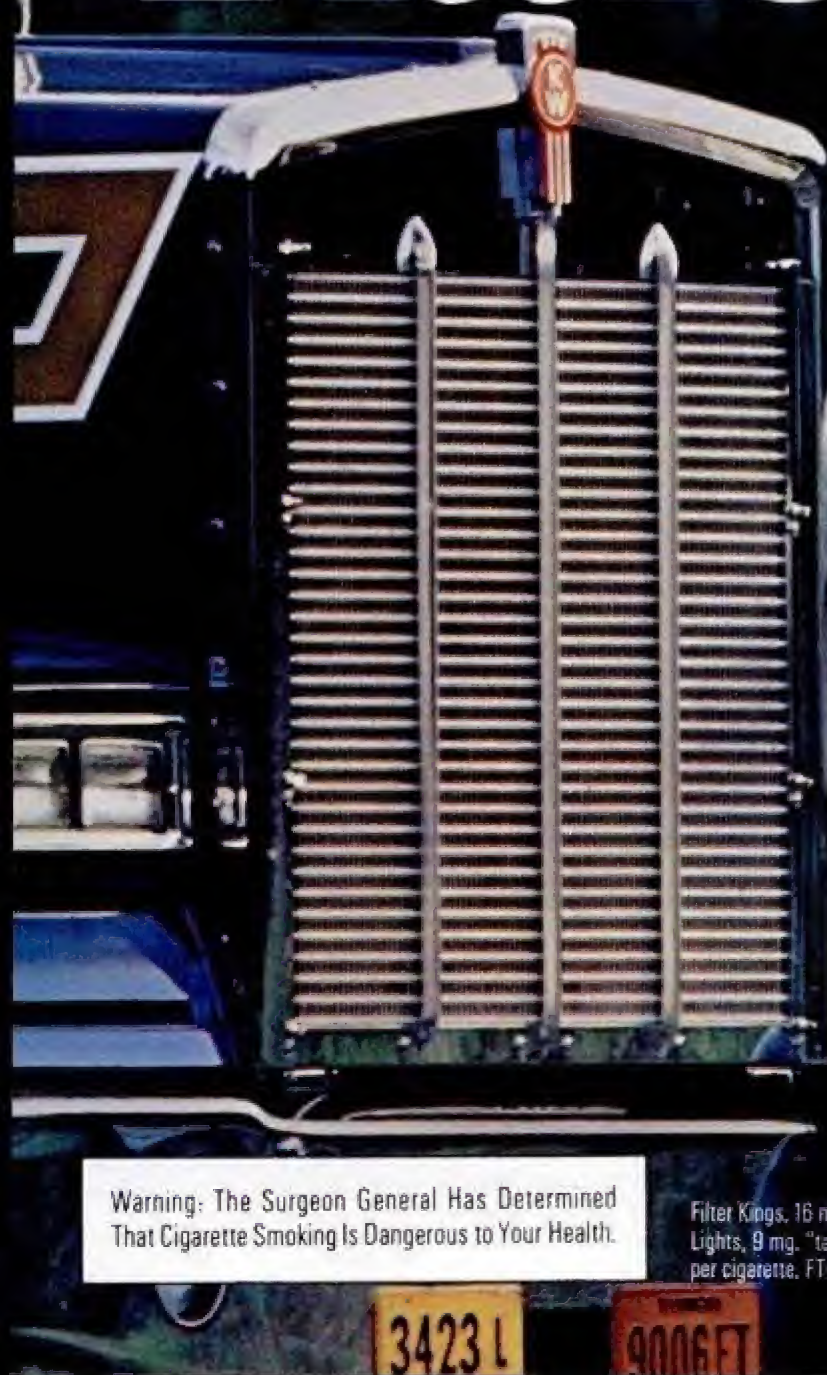
Protect small trees, bushes and trellises from strong winds and vandals with the Duckbill Hercules earth anchor. Each kit (\$9.97) contains three earth anchors, three tree collars, 24 ft. of wire and an 18-in. drive rod to hammer the anchors into the ground. Available at garden and home centers. Made by Foresight Industries Inc., Box 4067, 2114 Pioneer Ave., Cheyenne, Wyo. 82003. **PM**



Take the  
road to flavor.



# Raleigh

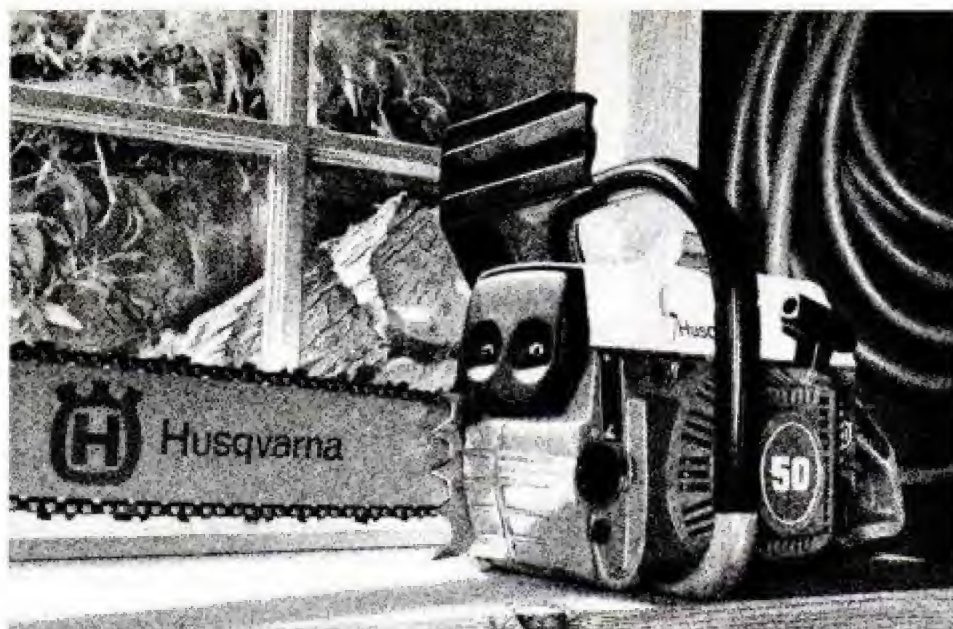


Warning: The Surgeon General Has Determined  
That Cigarette Smoking Is Dangerous to Your Health.

Filter Kings, 16 mg. "tar", 1.0 mg. nicotine,  
Lights, 9 mg. "tar", 0.7 mg. nicotine av.  
per cigarette. FTC Report Mar. '88.

© 1983 B&W T Co.





## The Husqvarna 50 Rancher cuts weekends down to size.

No matter how often a saw is used, it should have the same high standards of quality and performance that professionals demand. That's why the Husqvarna 50 Rancher is built to the same professional standards as all our chain saws.

Besides its easy-to-handle design and excellent power-to-weight ratio, the Husqvarna 50 Rancher features electronic ignition. An automatic oiler. An anti-vibration system. Plus a totally automatic, permanently adjusted inertia chain brake. Also, it's easy to start and restart.

The Husqvarna 50 Rancher. Designed to make the non-professional work like a pro.

**Don't forget. Husqvarna prices have come down.** Getting Husqvarna quality won't set you back as much as it used to. In fact, you can buy a tough, rugged Husqvarna for about the same cost as a chain saw of lesser quality. So if you've ever considered owning a Husqvarna, now is the time to get one.

For the dealer nearest you, consult your Yellow Pages or write Husqvarna, 224 Thorndale Avenue, Bensenville, Illinois 60106.



Get a free carrying case when you buy a new Husqvarna 44, 50 or 61 Rancher chain saw, at participating dealers, while supplies last.



## HINTS FROM READERS

### Thumbscrew setscrews



To loosen hollow-head setscrews easily when removing the spindle-control capstan arms on a drill press, replace the setscrews with thumbscrews. The  $\frac{1}{4}$ -20 thumbscrews shown were made by brazing steel disks in the slots of hex washer-head bolts. Use thumbscrews for wrench-turned setscrews only when they can be tightened safely by hand. —Walter E. Burton

### Soaking a paintbrush



Sometimes paintbrushes become so clogged with paint that they require overnight soaking in thinner to dislodge the deposit. To keep the bristles from curling under the weight of the handle as they rest on the bottom of the soaking container, clamp the brush handle to a scrap of wood that's long enough to bridge the sides of the container. Adjust the paintbrush so the bristles are suspended slightly off the bottom. Add enough thinner to cover the bristles. —Kenn Oberrecht



# PM PHOTO HINTS

## Darkroom help



Bumping the handle of a negative carrier can mean refocusing. Paint the handle white.—*Kenneth Brooks*

## Jaws



Attach a machine screw to side of alligator-grip light. Then attach a swivel-head tilt-top for double-duty light that holds a camera.—*Robert Hertzberg*

## Forget-me-not



It's easy to forget what film you've loaded. Tape the end flap from film box onto camera.—*Bob Brightman*

# WHEN DUTCH BOY GOES ON, THE VALUE GOES UP

Three professional appraisers carefully inspected this house. Its average value: \$75,400. Then it was painted inside and out with quality Dutch Boy

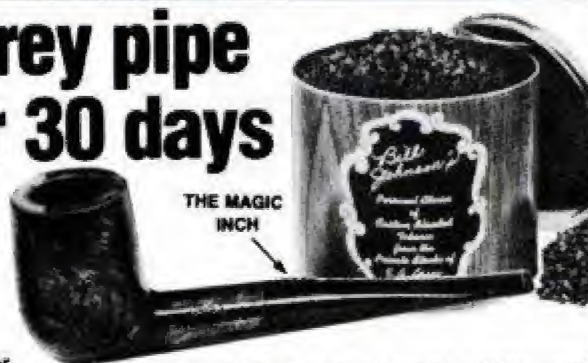
paint. And it was appraised again. Average value: \$86,100. Increase the value of your home with long-lasting Dutch Boy Paint.

**BEFORE DUTCH BOY**  
APPRAISED VALUE  
**\$75,400**

**AFTER DUTCH BOY**  
APPRAISED VALUE  
**\$86,100**

# Try this Carey pipe "FREE" for 30 days

and we'll even  
give you the  
tobacco FREE!



Smokes like no pipe you've ever known! Be delighted or smash it with a hammer and the trial will cost you nothing.

It's a new concept in pipe smoking. Top grade Mediterranean briar with patented innovation—"Magic Inch"—harnesses Nature's own laws to provide the sweetest, smoothest, coolest, most satisfying smoke of your life! Not a filter, or a trap. No sludge, moisture or bitterness. Nothing but pure smoking satisfaction you've never known before.

Whether you're a pipe smoker or merely wish to cut down on cigarettes, you're invited to take advantage of this unusual offer. After 30 days, if you don't agree that no other pipe gives you the full rich aroma, deep down smoking pleasure and peace of mind only a Carey pipe can give, smash it with a hammer. The trial has cost you nothing. Even the half-pound humidor of tobacco is yours to keep free.

Send for a free color brochure and select the style and shape pipe you want for your free 30 day trial. Mail coupon today or call toll-free.

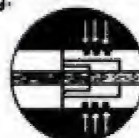
**FOR FAST INFORMATION  
Call Free! 1-800-323-1717.**

(In Illinois: 800-942-8881.  
Ask for Operator 67.)

**EACAREY, INC.**

639 Academy Drive, Northbrook, IL 60062

HOW THE "MAGIC INCH" COOLS, DRIES AND MELLOWS YOUR SMOKE



**Cool Air**  
Fresh air enters through vents, mixes with smoke from bowl... cooling and condensing it.



**Condensation**  
Condensation "squeezes" excess moisture from smoke and is absorbed by the "Magic Inch"



**Evaporation**  
Moisture evaporates into outside air... You get a cool, dry smoke.

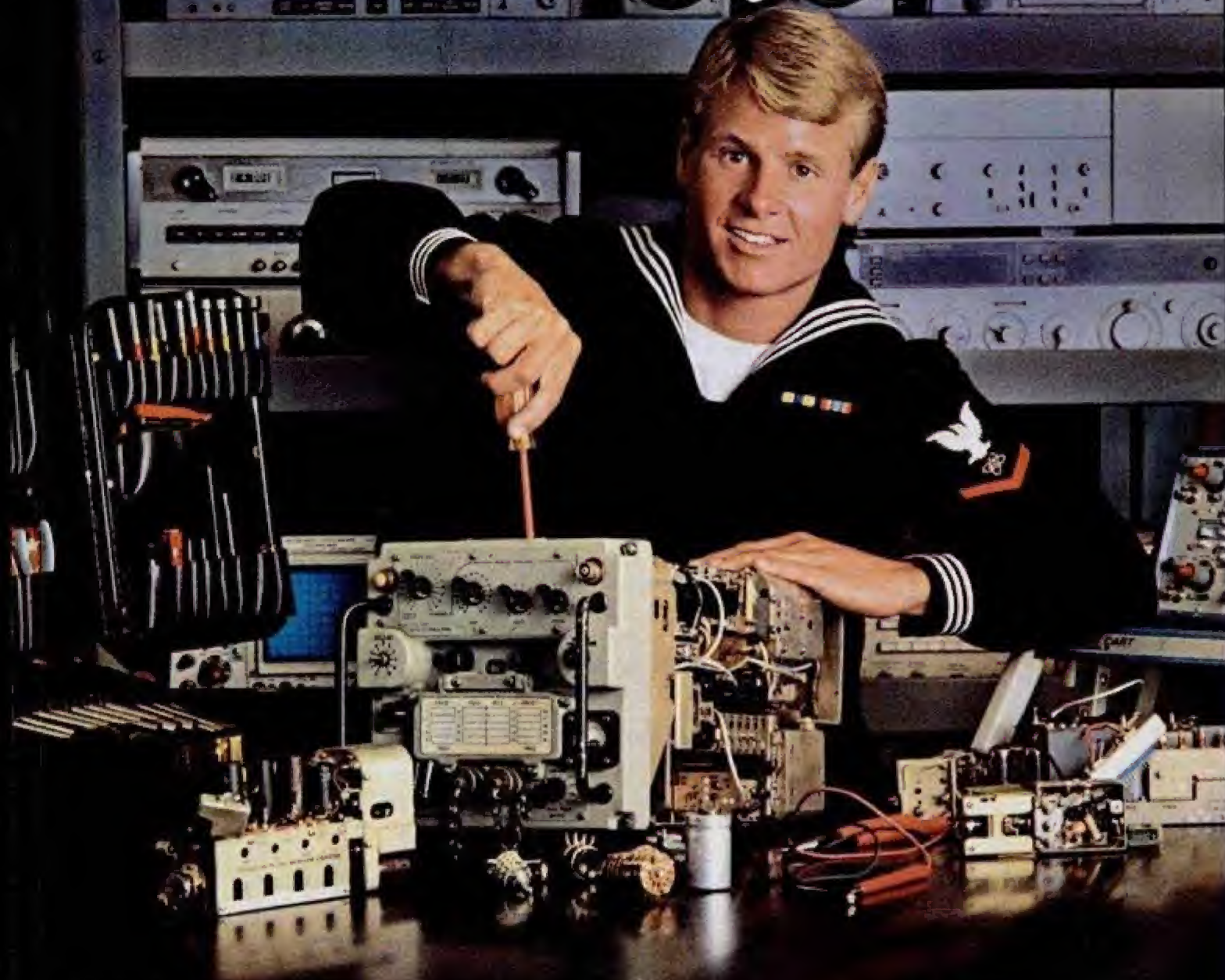
**EACAREY, INC. DEPT. 2550X**  
639 Academy Drive, Northbrook, IL 60062

Yes! Send me your full color brochure so I can select a pipe to smoke for 30 days on a free trial basis.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_  
My Telephone is (\_\_\_\_) \_\_\_\_\_



# New Challenges Are Part Of The Navy Adventure.



Every day as a Navy specialist you encounter new challenges, new tests of your rapidly growing technical skills.

And you're ready. Because the Navy Adventure begins with first-class training. Training that's tough, demanding, and extensive. Navy classroom training that prepares you to meet the new challenges that are part of today's important technical

skills. Then, practical hands-on experience helps you master the job you chose.

In the Navy you can choose the technical career you want to learn. Pick from today's hottest technologies: micro-electronics, state-of-the-art computers, advanced communications, nuclear power, and more. There are over 60 career areas, 75,000 technical jobs a year. One of

them can be yours.

Along with a high-tech career comes the highest Navy pay ever. Starting pay is over \$550 a month plus housing, food, medical and dental care, special pay for sea duty, and 30 days' vacation earned each year.

Find out more about the new challenges and new rewards you get in today's Navy. Call 800-327-NAVY, toll-free, today.

## Navy. It's Not Just A Job, It's An Adventure.



# THE PM WORKBENCH



## Steel bottle is super container

Since I'm back on the housebuilding scene (erecting a home that you'll see in PM next spring), I purchased an all-steel thermos that's claimed to be virtually indestructible.

Those who know me are aware that coffee is always nearby and this jug assures that, even during some pretty hectic construction sessions. If you're faced with conditions that might "put the boots" to your thermos, give strong consideration to buying this beauty. Though the thermos has been dropped from the roof more than once, it stays on the job keeping coffee hot for a full day.

The Aladdin Stanley one-quart thermos is \$32 at department stores, sporting goods outlets and hardware stores. Aladdin Ind. Inc., Box 100255, 703 Murfreesboro Rd., Nashville, Tenn. 37210 is the maker.—H.W.



All-steel construction and a five-year warranty makes this thermos suitable for job-sites, campsites and schoolyards.

## Sitting pretty

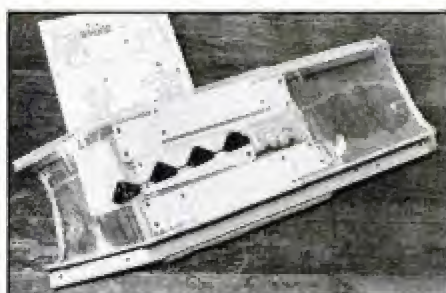
When I was in need of a lightweight, easy-to-park stool for use at the drawing board in my shop, I recently assembled the version shown here.

It's sturdy enough for a large-sized man to sit upon, yet still light enough for a youngster to handle. Available in five colors, the Work N'Hobby Stool is sold at discount department stores for \$9.95.

It is manufactured by Hirsh Co., 8051 Central Park Ave., Skokie, Ill. 60076.—H.W.



This sturdy stool is quick and easy to assemble. Angled legs provide added stability.



Stool comes knocked-down, with assembly instructions. In a factory-sealed bundle.



Attach the mounting clips to the seat underside with the screws provided. Then fasten the clips to the steel frame.

## You won't get bored with these bits

The folks at Omark, who have been making saw chains since your granddad was reading PM, are now in the drill bit business. And they picked a fine set of tools with which to make their entry.

The bits—dubbed the X-360—have points sharpened with a second bevel which the maker calls a split point. Result: You can start drilling in most hard materials without the bit drifting as the drill is started.

The bits are available individually and in sets (shown).

Write directly to Omark Ind., Credo Div., 2765 National Way, Woodburn, Ore. 97071 for details, including prices and the dealer nearest you.

—H.W.



Stacking trays make it easy to organize your drill bits. Each bit diameter is clearly marked on the tray.

The powerbit set is for boring holes in wood up to 1-in.-dia. The bits stand upright in a base that features a drawer for storing chuck keys, extra bits and countersinks.



Individual six-bit sets are also available.

If you've come across a new product with some special features, let us know about it. Write to PM Workbench, Popular Mechanics, 224 West 57th St., New York, N.Y. 10019.



# You know this girl. She's running for you.

## And after a lifetime of training all she needs is your support.

In the early hours of the morning you can see her running. She may run 80 to 90 miles a week, hold down a full-time job, carefully monitor her diet—and maintain her family life. Quite a feat!

She's doing it for the ultimate—the Olympics. And for the honor of representing the United States in the Games ...to represent you.

She needs your support.

Her training is costly. So are her expenses to travel to the 1984 Olympic Games in Los Angeles.

The President and the Congress have aided the cause of our young Olympic athletes by passing the Olympic Commemorative Coin Act, designed to provide financial support through the sales of special Olympic commemorative coins.

### You can help by acquiring these unique coins.

To celebrate our being the host nation in the 1984 Olympics, the United States Mint has issued for the first time in history three types of coins to commemorate the spirit and excitement of the Olympic Games. And it is the first time in some 50 years that the United States Government has minted a gold coin.

### All profits from the coins will go toward our Olympic efforts.

All profits from the sale of these special coins will go toward the U.S. Olympic effort, for training expenses, the ever-rising costs of sending our team to the Olympic Games, and for the staging of the 1984 Games in Los Angeles.

### The coins will preserve the memory of that moment.

These exceptionally beautiful silver and gold coins will bring you and your family great pleasure as a treasured heirloom of history and beauty.



### Fine artistry of their designs.

The 1983 silver dollar coin (.77 troy oz. silver) has been designed by Elizabeth Jones, the chief engraver at the Mint. The obverse (or front) of the coin represents a dramatic engraving of the classic Greek discus thrower.



**SUPPORT  
THE HOME TEAM.**

The 1984 silver dollar coin (.77 troy oz. silver) has been designed by Robert Graham, a renowned sculptor from Los Angeles. It will bear a representation of the Gateway to the Olympic Coliseum on the obverse of the coin.

The 1984 ten dollar gold coin (.484 troy oz. gold, 21.6 karats) was designed by John Mercanti, the youngest member of the U.S. Mint engraving staff, from a concept developed by James Peed, a U.S. Mint artist. He has captured the penetrating scene of the Olympic Torch bearers in delicate detail.

### These magnificent Olympic coins are flawless gems

They are now being offered in "proof" condition, which involves specially prepared dies and planchets and special multiple striking, resulting in particular sharpness of detail and a flawless mirror-like surface.

### You have three options

You can buy the single 1983 silver coin; the two-coin set which includes the 1983 and 1984 silver coins; or the three-coin set which features the 1984 gold coin, the 1983 silver and the 1984 silver coin.

### Or ...

You can buy several sets. It has been apparent from the first that Olympic commemorative coins have struck a responsive chord among coin collectors, hobbyists, sport lovers and many people who are buying these special coins to give as a "gift of inspiration."

The more coins you purchase, the more you will be helping our fine Olympic athletes. And that feeling of helping and participating in this important Olympic event is a gift to yourself.

Order now!



Mail this form and your payment to:  
**United States Mint,  
Olympic Coin Program,  
P.O. Box 6766,  
San Francisco, CA 94101**

- Option #1 Single-Coin Set**  
One 1983 Silver Coin \$32
- Option #2 Two-Coin Set**  
One 1983 and one 1984 Silver Coin \$64
- Option #3 Three-Coin Set**  
One 1983 and one 1984 Silver Coin plus one 1984 Gold Coin \$416

Mail coins to: **025110001B**

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

I want the following coins:

Option #1 \$32.00 x \_\_\_\_\_ = \$ \_\_\_\_\_      Option #2 \$64.00 x \_\_\_\_\_ = \$ \_\_\_\_\_      Option #3 \$416.00 x \_\_\_\_\_ = \$ \_\_\_\_\_

Postage & Handling	Total Payment
\$2.00	\$ _____

Payment ☐ Check ☐ Money Order ☐ VISA ☐ MasterCard

Expiration Date

Acc. No. \_\_\_\_\_

\_\_\_\_\_

**VERY IMPORTANT—PLEASE READ:** Yes, please accept my order for Olympic coins. I understand: All sales are final and not subject to refund, and verification of my order will be made by the Department of the Treasury, Bureau of the Mint. I expect at least 6 to 8 weeks from purchase to delivery. Delivery of 1984 coins will begin January 1984. My coins will be delivered registered mail and may be in multiple shipments. My order placed by credit card will be charged immediately to my account and may result in finance charges or other fees prior to delivery of coins. I understand orders will be processed as they are received, and if bullion prices rise significantly, the Mint has the right to discon-

tinue order acceptance. Once my order is accepted, however, it will not be cancelled for that reason. I have read, understand and agree to the above.

Signature \_\_\_\_\_ Date \_\_\_\_\_

★ U.S.A. Olympic Organizing Committee



# HOME WIRING FIXUPS: Do Them Right

Electrical repairs *must* be done by the book. But they can be easy and will save you money.

BY RICHARD NUNN

**T**he secret of successful electrical work is to respect electricity. Always shut off the power before you start. Pull the fuse, flip the circuit breaker or open the master switch at the service entry panel where the current comes into your house.

Some older houses may have more than one service entry if circuits have been added, so double check to see that the power really is off. How? By using a circuit tester—insert its probes into the outlet—or by plugging in a table lamp. No light and you know the circuit is dead. Double check by touching the black (hot) and white (neutral) wires with a circuit tester after removing the wall plate. Many pros hang a sign on the main service entry warning not to turn on the power.

If you add a circuit or install new wiring, you may need a permit from the building inspector in your town. After the work is done, but before the walls are closed, you may have to get the job inspected. Common household tools can handle most wiring jobs, but a circuit tester and a wire stripper will help.

## Replacing a plug

Even though the cord of a lamp or appliance lasts practically forever, rough handling can break the connections inside the plug. To repair it, you can either cut the plug off the cord and put on a new one or junk the old cord and make up a new one.

Always unplug any lamp or appliance before inspecting, cleaning or working on it. Tie an Underwriter's Lab (UL) knot, as shown on page 36, to keep the wires from pulling off screw terminals in plugs and lamps.

To rewire clamp plugs, raise the lever, insert the wires and lower the lever to lock them in place. Specialized plugs come with instructions. Appliance cords, like those on electric irons, often have welded connections and must be replaced.

## Rewiring lamp sockets

Changing a lamp socket with a failed switch or burned insulation is almost



Battery-powered continuity tester is used to check out a wall switch. With power shut off at the service entry, remove the switch plate and mounting screws so you can bring the switch out of its box with wires attached. With the switch turned on, the tester should light when you touch its leads to the brass (black wire) and silver (white wire) terminals. Tester should go out when the switch is turned off. If the tester does not light, the switch is bad.



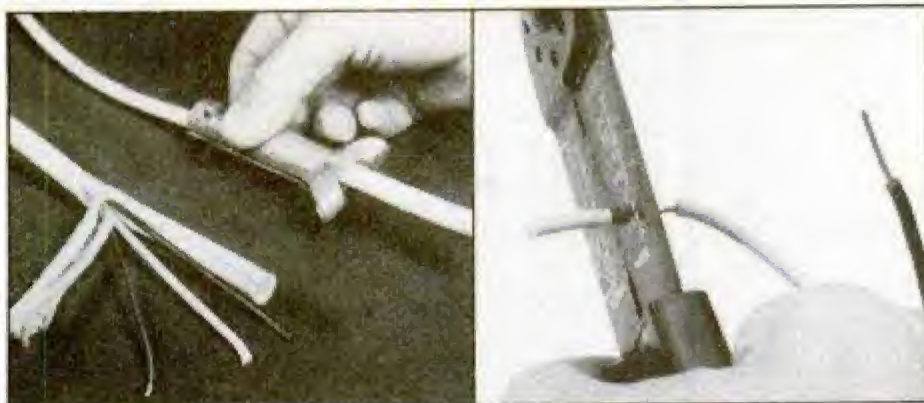
Junction boxes, also called GEM boxes, must enclose and protect all splices, connections, switches, outlets and other in-wall wiring fixtures. Surface wiring boxes are slightly different. This in-wall wiring junction box has removable ends so two or more boxes can be ganged to make one larger box.



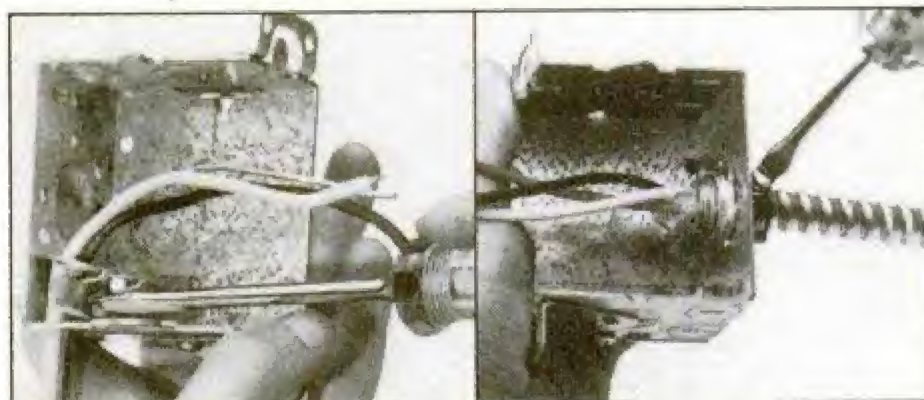
Cut metal-armored BX cable by hacksawing through the two coil wraps at an angle. Break the sawed cable to expose the wires, which are then cut with snips. Insulators protect conductors from sharp cable end.



# HOME WIRING FIXUPS:



Cut back BX or plastic sheathing about 6 inches with a utility knife or special plastic sheathing cutter (left, top). This will free the wires for stripping with a hand tool (right) that also cuts wires and screws, in addition to crimping solderless terminals.



The round junction-box knockouts can be pried out with a screwdriver to admit plastic-sheathed cable (small size) or armored BX (large). Inside the box, clamp plastic cable (left) or secure BX with special fittings (right) over the red insulation protector.



A solderless connector joins two wires inside a GEM or other junction box. Twist the stripped wires together (left) and screw the connector down tightly to make the splice. Wrap the connector and wires with insulating tape (some codes require friction tape).

the same as rewiring the lamp. Take the lamp apart and run a new wire through it before connecting the socket. Replacing the socket is a straight swap.

If the insulation sleeve is the only defective part, check the terminals for tightness and replace the sleeve.

Two-socket lamps should have both sockets replaced even if only one is bad. Parts come as an assembly. But two-socket lamps wired independently so each bulb turns on and off with the same switch can have either socket replaced separately.

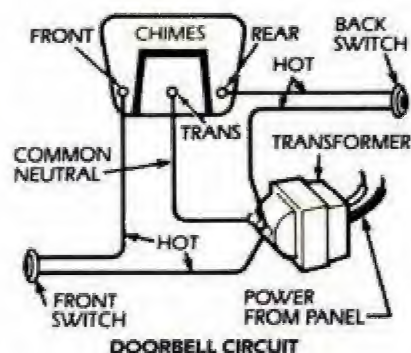
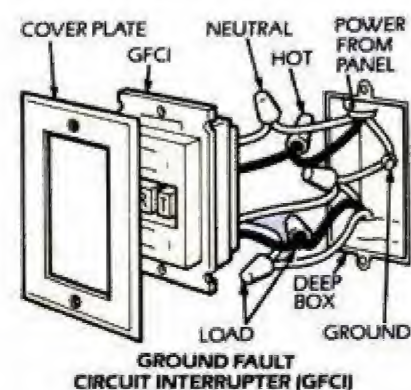
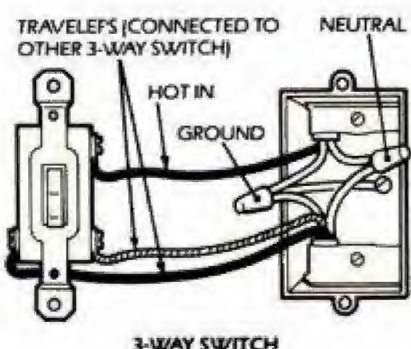
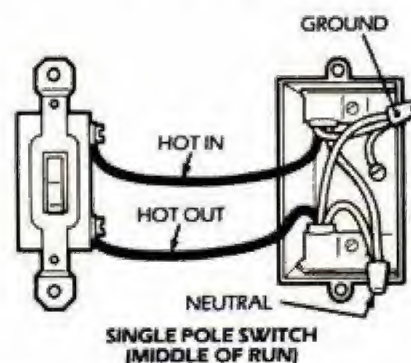
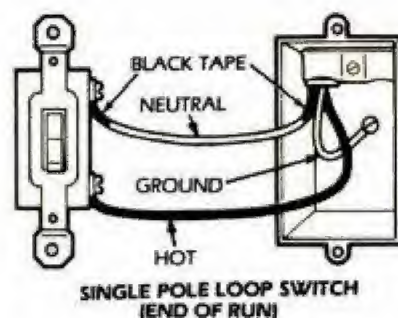
Three-socket lights can have their

sockets replaced one at a time. Follow the wiring as installed originally. Lamp switches that are not part of a bulb socket come prewired. Install them by cutting out the bad switch and hooking up the new one with solderless connectors and tape.

## Changing wall switches

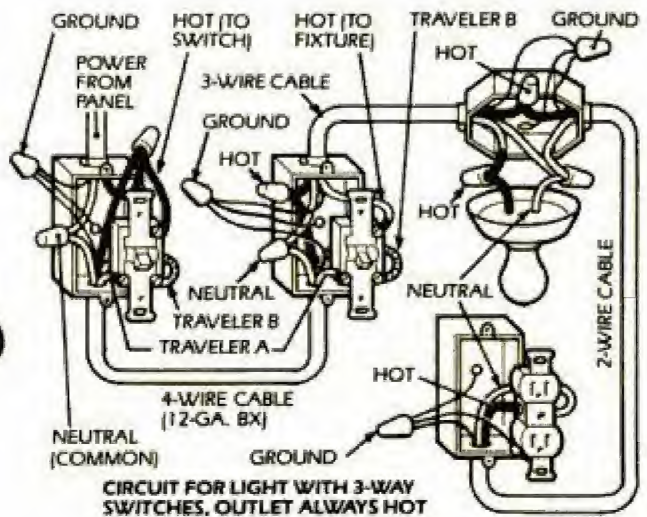
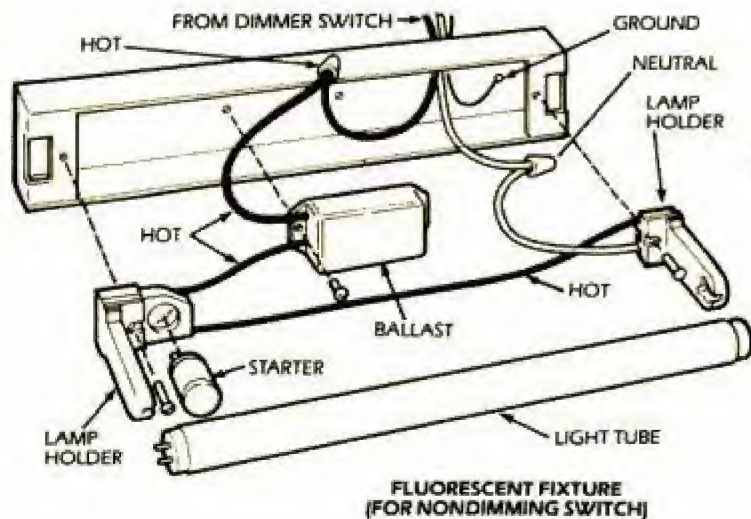
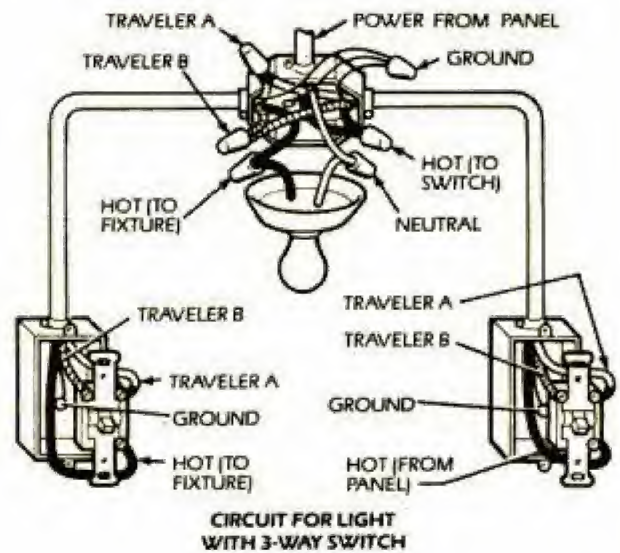
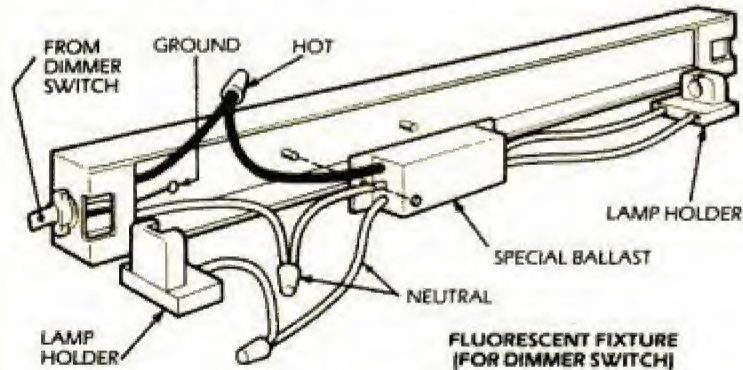
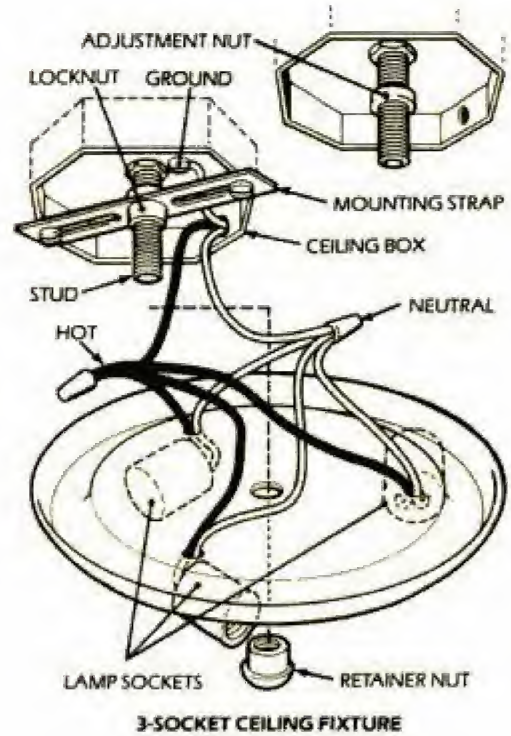
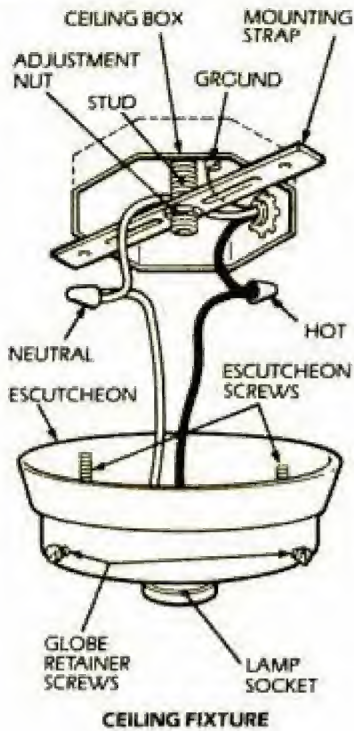
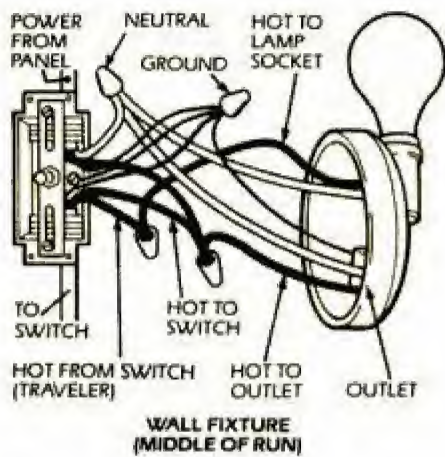
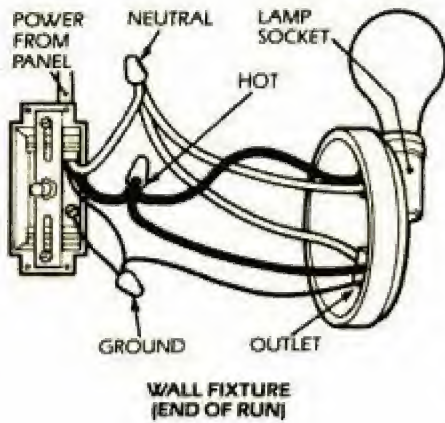
Wall switches, like all other house wiring junctions and controls, are mounted inside protective boxes. Before removing the switch cover plate, shut off power to the circuit.

Get an identical switch for the one





## BASIC WIRING HOOKUPS





# HOME WIRING FIXUPS:



Bend the stripped-wire end into a hook (left) by gripping it with long-nose pliers and twisting. Hook the wire around the terminal screw (right) so that as the screw is tightened in a clockwise direction, the wire will wrap tighter around the terminal.



Wrap the switch or other fixture in insulating tape after connecting the wires to prevent shorts when inserting in box.



Tie a UL knot in lamp and wall plug cords to keep the wires from pulling off terminals.

you must replace. Single pole switches have only two terminals and control a light from one point.

Three-way switches let you turn a light on or off from either of two points. They have four terminals: two for the switch, one for a traveler wire taking power to the other switch, and a metallic ground.

A four-way switch controls a light from a third location working with two three-way switches. It has four brass terminals, all of which accept traveler wires to the two three-way switches, and a ground.

Front-, side- and back-wired switches are the same except for terminal location. Some back-wired switches have spring slots (you poke the wire into the slot to make the connection) instead of screw terminals. These are only for use with copper wires. Do not use them with aluminum wires.

## Changing receptacles

Like wall switches, outlets and receptacles are in wall boxes protected by cover plates. Replacing one is almost the same as replacing a switch.

A single outlet usually has three terminals: brass (hot), silver-colored (neutral) and green (ground). A double outlet has five terminals: Four power the outlets and the fifth is a ground wire (green).

## Changing a ceiling fixture

A ceiling fixture is simply an overhead wall box, except that it has a support bar. To work on the fixture, shut off the power, remove the decorative nut at the bottom of the escutcheon and lower the fixture from the ceiling. Support it on a wire hook made from a coat hanger to keep the strain off the wires. Disconnect the wires, remove the old fixture, connect the new one and remount it on the stud with the escutcheon nut.

## Installing a dimmer switch

Procedures for putting in a dimmer switch vary for different kinds of lights. Special installation instructions come with the dimmers and should be followed exactly. Fluorescent dimmers replace the ballast resistor in the fixture as well as the switch.

## Three-way switches

You can't simply replace two single pole switches with three-ways to get two control points for the same light. You need a third wire, called a traveler or messenger, to carry power between the switches. But, if the traveler is not in the wall cable, installing one can be more trouble than the job is worth.

Changing an existing three pole switch is a straight swap. If you put the hot lead on a traveler terminal, the switch won't turn off. Cure this by moving the hot wire to the hot terminal.

## Ground fault interrupter

Many modern houses have ground fault circuit interrupters to reduce shock hazard in the kitchen and bathroom. A GFCI detects current leakage in a hot wire and instantly trips a circuit breaker to prevent electrical shock. Should an appliance short out and charge the housing, a GFCI protects you if you touch it.

Installation in an existing line should be made near the main service entry. The GFCI protects only downstream outlets. After killing the power, cut into the line and install a standard box. The GFCI has four wires which splice onto the conductors. Follow the instructions supplied with the unit. Push the RESET button to set the GFCI. Then hit the TEST button to make sure it's working. If the appliances on the line have no power, first reset the GFCI, then check the fuse or circuit breaker.

## Fixing doorbells

Most doorbell or chime problems lurk in the outside pushbutton. It's exposed to the weather and is apt to corrode. Test the button by bypassing it. Kill the power, remove the button and disconnect one wire. Restore power and touch the loose wire to the other wire. If the bell rings, replace the pushbutton. Bells have low-voltage circuits powered by a transformer. Check for power to the transformer. If there is none, look for a fuse or resettable breaker. Replace a bad transformer.

If the bell won't stop ringing, there's a short in the wiring. It may be easier to run a duplicate line than to find and fix the short in the original.

## Outdoor outlets

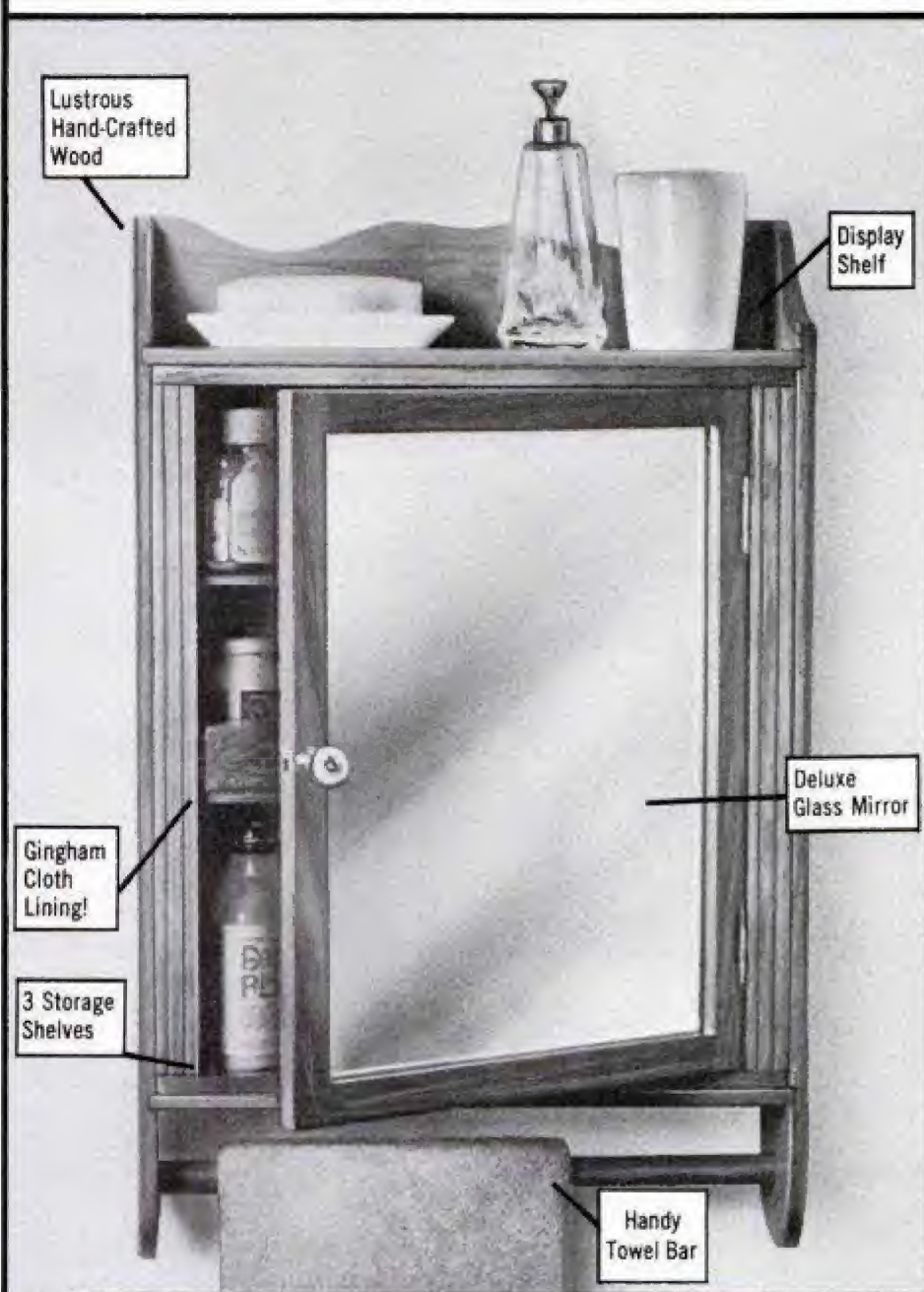
Adding an outdoor outlet or replacing one is similar to indoor work. However, you must use special outdoor fixtures with rubber gaskets and waterproof cover plates that are shock-protected by a GFCI. Use UF sunlight-resistant Type TW outdoor cable buried at least 18 inches underground to power the outlet. It should be supported at least 18 inches above grade using metal conduit with a fiber bushing and a cement block set in concrete. **PM**



# SALE!

SAVE over \$5.00  
Thousands sold  
at \$19.95

NOW ONLY **\$14<sup>88</sup>**



CHARMING ANTIQUE REPLICA harks back to Great-Grandfather's day... Still as beautiful and practical as ever! A warm, homey touch for your decor... So much nicer than ordinary medicine cabinets! And the price is truly amazing—The original antique (if you could find one) would cost well over \$100.00.

### LUSTROUS HAND-CRAFTED WOOD... Lined With Old-Fashioned Gingham!

Quality and workmanship you seldom see any more... Hand-crafted wood with a hand-rubbed, antiqued finish. Traditional Americana styling—a big mirror, a knick-knack shelf

on top, a towel rod beneath. Inside are 3 shelves and a perky gingham cloth lining. Over 20 inches high, with lots of storage space... shipped unassembled. A wonderful old-fashioned value at only \$14.88!

### FULLY GUARANTEED—

Quality, Convenience, Decorator Charm. If not thoroughly delighted, simply return in 14 days. We'll gladly give you a full refund (except ship. & hdg.). Our policy is to process all orders promptly. Credit card orders are processed upon credit approval. Delays notified promptly. Shipment guaranteed within 60 days.

**KEYSTONE PRODUCTS.**  
Hanover, PA 17333

Serving Satisfied Customers Since 1934



## BUILD YOUR OWN

# Olde-Tyme Medicine Cabinet

Magnificent SOLID WOOD KIT—  
Replica Of A  
\$100.00 Antique!

Not \$40... Not \$20

NOW ONLY **\$14<sup>88</sup>**

PERFECT FOR:

- Bathroom
- Kitchen
- Workshop

Beautiful & Roomy—  
Over 20 Inches Tall!

SATISFACTION GUARANTEED—MAIL TODAY!

KEYSTONE PRODUCTS, Dept. HZ-3398  
Bldg. #49, Hanover, PA 17333

Yes! Please rush my *Wooden Medicine Cabinet(s)* (Z533752) as indicated below, on full money-back guarantee.

- ☐ One for only \$14.88 plus \$4.00 heavy-weight shipping & handling.  
☐ Save More! TWO for \$28.88 plus \$4.75 heavyweight shipping & handling.

Enclosed is \$\_\_\_\_\_ (PA res. add sales tax)

CHARGE IT: ☐ VISA ☐ Diners Club  
☐ American Express ☐ MasterCard

Acct. No. \_\_\_\_\_

Exp. Date \_\_\_\_\_ (please print:)

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_ ZIP \_\_\_\_\_

© H.H.I., 1983.



# THE PM GARAGE



## Eliminating knocking problems

Engine knock is a problem that plagues many drivers. Knocking or pinging is not only annoying, but severe cases can cause engine damage. Knock is



**Vara-Jection kit contains electronic module, tank, hoses and all of the necessary wiring.**

most often caused by low-octane gasoline, road conditions (such as hills), combustion chamber deposits and turbocharging.

Edelbrock's Vara-Jection system is a method of monitoring an engine's vacuum pressure and rpm, then injecting a water mist directly into the carburetor. The water mixes with the gasoline to enhance fuel burning and reduce knocking.

Vara-Jection is a complete kit that's easy to install. We put it on a friend's van in a few hours one Saturday afternoon. He can now use regular gas with no ping, and the van seems to have more power under load in hilly terrain, where he had had problems in the past. The kit retails for about \$90 at most speed shops. For information, contact Edelbrock, 411 Coral Circle, El Segundo, Calif. 90245.—*Joel Breault*

### Truckbed liner

It's hard to keep the bed of your pickup from getting all beat up if you do any kind of serious cargo hauling. The Duraliner will protect your cargo box, sidewalls and tailgate from signs of abuse. The unit features one-piece

seamless construction, and will withstand extreme impacts. It will not become brittle at  $-60^{\circ}\text{F}$ . It's \$299.95 for domestic pickups, \$279.95 for imports, from Durakon Inc., Box 694, Grand Blanc, Mich. 48439.

—Mike Lamm



Dings look bad enough and also invite rust. Duraliner provides good impact protection.

### Plug hole fixer

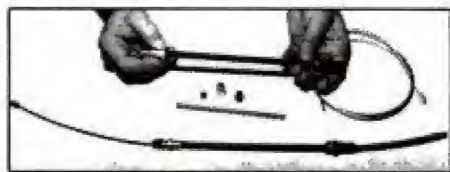


**After reaming out damaged sparkplug hole threads, hammer in insert with special tool.**

Heli-Coil, the company that pioneered coil spring thread repair inserts, now has a kit to repair stripped or damaged sparkplug threads on aluminum cylinder heads.

The kit works with both gasket and tapered-seat sparkplugs. First you screw the tap reamer into the damaged threads, which enlarges the hole for the insert. Then you hammer in the insert with an installation tool, as shown above. Teeth on the insert ensure a secure fit. Heli-Coil, Shelter Rock Lane, Danbury, Conn. 06810, sells the kit through auto parts stores for about \$25. —Paul Weissler

### Brake cable kits



**Adjustable brake cable kit allows you to tailor length and fittings for your car.**

Ever try to order a parking brake cable? There are more than 1,300 of them! No store stocks them all. Canadian Jean-Paul Dussault has solved the problem with an adjustable replacement cable kit. Only 24 kits cover 1,300 car models. Tell the dealer the make and year of your car, cut the cable to the required length and screw on the self-threading end fittings. Prices range from about \$15 to \$28. The kits, branded ABSCO, are marketed in the United States by Mercier Electronics Corp., 810 South Hampton Rd., Westfield, Mass. 01085. Write to Mercier for more information.—*Paul Weissler*



# COMPUTERS ARE CREATING JOBS FOR NRI-TRAINED PEOPLE.

## IF YOU'RE SERIOUS ABOUT MAKING MONEY IN MICROCOMPUTERS, NRI IS SERIOUS ABOUT SHOWING YOU HOW.

The U.S. Department of Labor projects job openings for qualified computer technicians will soon double. International Resource Development, Inc., estimates a 600% increase in these jobs in a decade. And most of these will be new jobs, created by the expanding role of computers.

## NEVER HAS THERE BEEN A FASTER-GROWING FIELD OF TECHNOLOGY.

Many people are afraid of losing their jobs to computers, but thousands of jobs will be created for those who are prepared to meet the challenge.

With NRI training, you'll be prepared. You can have a profitable, exciting future as an expert

who can handle the operational, programming and technical aspects of all kinds of microcomputers and microprocessors.

## LEARN IN YOUR SPARE TIME.

NRI trains you in your own home, at your convenience...no classroom schedules to meet, no need to quit your job. As a class of one with complete course materials and the backing of a staff of professional electronics instructors, you'll get extraordinary hands-on training on the latest, most popular microcomputer: the new TRS-80™ Model 4 with Disk Drive. Designed to perform diverse personal and business functions and accept more software, the TRS-80 is yours to keep.

## LEARN HOW TO USE, PROGRAM AND SERVICE STATE-OF-THE-ART MICROCOMPUTERS.

Through your carefully designed NRI course, you'll get a wealth of practical experience. You'll build circuits...from the simplest to the most advanced...with your NRI Discovery Lab.® You'll use a professional 4-function LCD digital multimeter for analysis and troubleshooting.

Your NRI course will include the new TRS-80 Model 4 with Disk Drive or the TRS-80 Color Computer with NRI Computer Access Card...plus a professional LCD multimeter, NRI Discovery Lab and hundreds of demonstrations and experiments. It's all yours to keep.

TRS-80 is a trademark of the Radio Shack division of Tandy Corp.

With NRI training you'll explore your computer's registers, memory and input-output ports. You'll even write programs to control the circuits you've designed and built. You'll perform hundreds of challenging experiments, always backed by a full-time faculty ready to help you personally.

When your NRI training is complete, you'll be a computer technician, ready for your first job — servicing, testing or programming all types of microcomputers — in a rewarding and challenging new career.

## THE CATALOG IS FREE, THE TRAINING IS PRICELESS.

Send the postpaid card today for your FREE 104-page catalog.



*For greater computer memory capacity, a double density disk drive is included.*

It's a valuable guide to opportunities and training in the high-tech revolution. You'll see how easily you become part of the growing high-tech world of microcomputers.

If the card has been removed, please write to us today.



**NRI School of Electronics**  
McGraw-Hill Continuing  
Education Center  
3939 Wisconsin Avenue  
Washington, D.C. 20016

**We'll give you tomorrow.**



# ARMY TOUGH.

**53,000 Chevy diesel trucks have joined the U.S. Army.** They'll be ordered into action by the U.S. Army Tank Automotive Command (TACOM). And action is what they'll get—the hefty-hauling, ground-grabbing, rough-rolling kind.

## **Rugged 4-wheel drive.**

Versatile Chevy 4x4s have the stuff to take on obstacle courses and win.

## **Powered by diesel.**

Designed especially for trucks, the 6.2 Liter V8 is America's most popular truck diesel—over 190,000 strong. Our diesel also was strong enough to pass tough NATO testing.

## **They earned their stripes.**

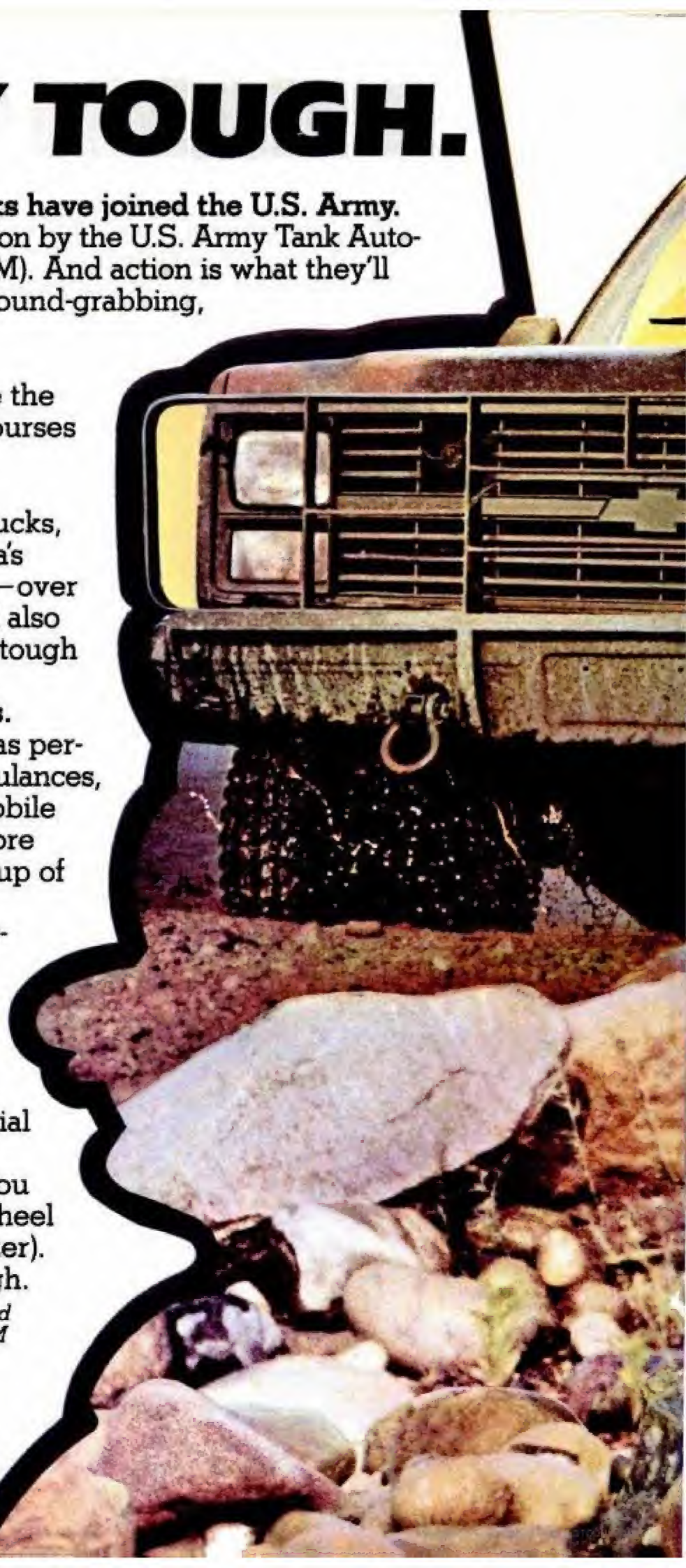
These vehicles will serve as personnel/cargo carriers, ambulances, command vehicles and mobile communication units. Before they were accepted, a group of vehicles was put through rigorous in-the-field endurance tests.

## **They're regular production Chevy trucks.**

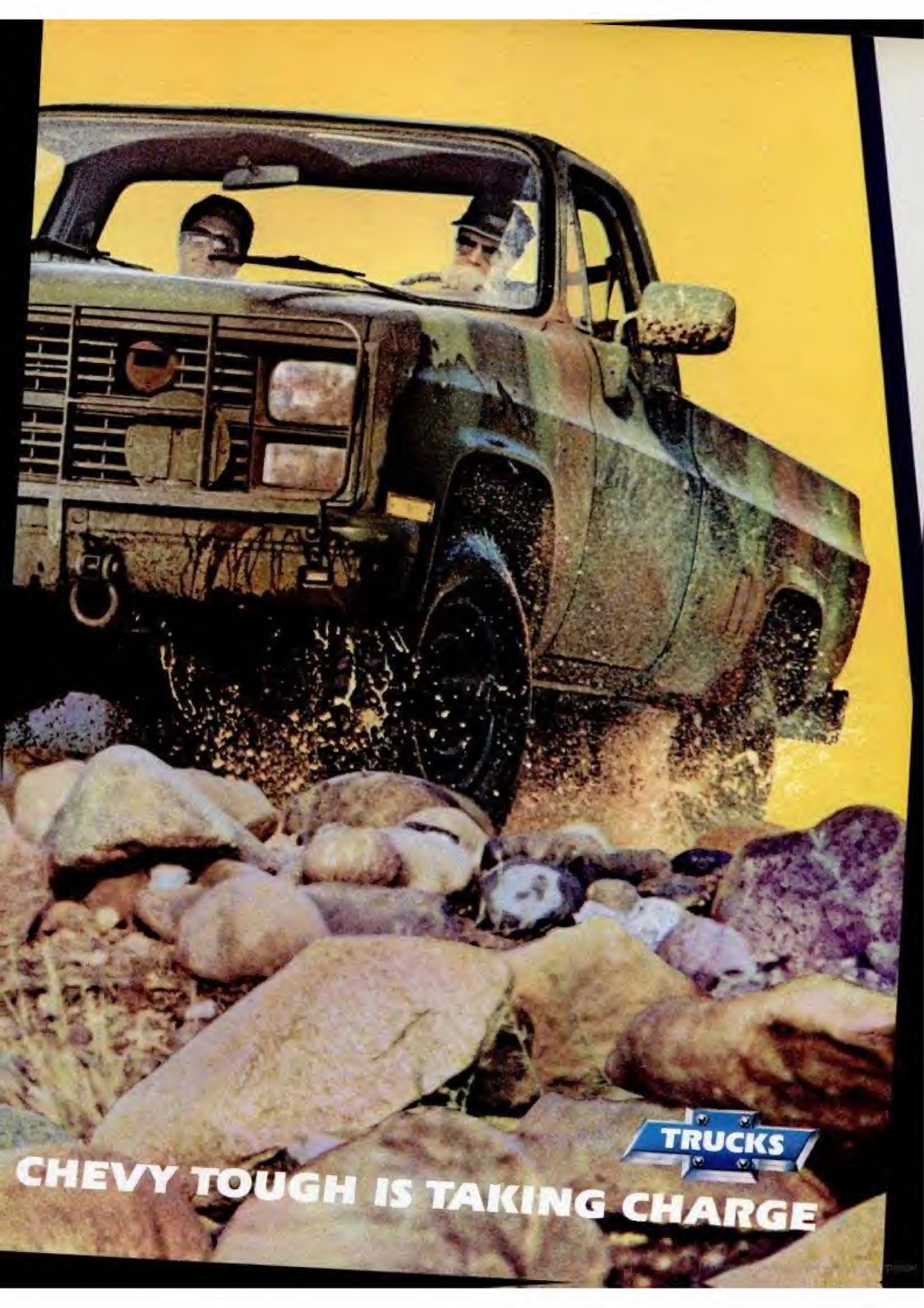
Just like the ones you can get, except for a few military adaptations like a special electrical system. But you can equip them the way you like. Gas or diesel, 2- or 4-wheel drive (4WD only with Blazer). Chevy tough is Army tough.

*Some Chevrolet trucks are equipped with engines produced by other GM divisions, subsidiaries, or affiliated companies worldwide. See your dealer for details.*

*Let's get it together... buckle up.*



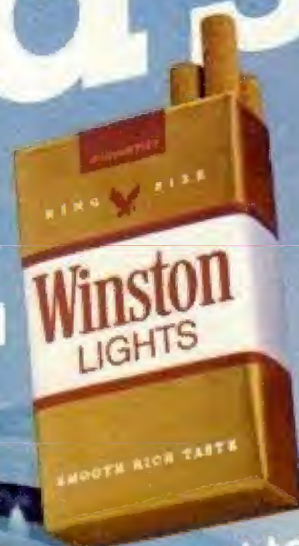




**CHEVY TOUGH IS TAKING CHARGE**



# Winston. America's Best.



Join the first team.  
Reach for Winston.

N47804

Warning: The Surgeon General Has Determined  
That Cigarette Smoking Is Dangerous to Your Health.

8 mg. "tar", 0.7 mg. nicotine  
av. per cigarette by FTC method.



# PM ELECTRONICS MONITOR



## Phone rates that are as high as an elephant's eye

Robert Braver, a 16-year-old in Norman, Okla., is, in his own way, a pioneer. In Norman they root for the Sooners—a football team named after the wagons that brought pioneer forefathers west. But while the original pioneers only had to worry about Indian attacks, sickness, and running out of food and water, Robert has been trampled on by a far mightier force—Oklahoma's Southwestern Bell.

Robert runs a popular electronic bulletin-board system on his TRS-80 Model 1 computer system. He even wrote his own software which enables other people to call his computer, leave messages and read messages from other people. To do this requires that Robert hook his computer to the phone line via a device called a modem.

Robert's problem arose when he called Southwestern Bell to ask for help in tracking down some annoyance calls that had been made to his system. Southwestern Bell couldn't help him there, but they did find a tariff regulation, passed in 1966, which enabled them to raise his phone bill from \$9 to \$45.90 a month.

The moral might seem to be never call the phone company—but this action is, we think, so threatening to the very fabric of this country's technological future that it hardly bears joking about.

### Modems and the future

Modems are, now, one of the most popular accessories to buy for a personal computer. With a modem you have access to literally thousands of services. People with modems attached to their computers can call small systems such as Robert's or large networks such as Compuserve and The Source. Hundreds of thousands of computerists of all ages are using modems to do everything from electronic mail to shopping and banking at home, joining computer clubs and generally plugging into the most exciting new revolution in communications since Gutenberg.

As more and more computers become available, it is likely that almost every home in America will someday have a modem. And, according to Southwestern Bell, a phone company

should be entitled to a tariff on these modems.

Should they be? We don't think so.

According to Southwestern Bell, the 1966 tariff was originally passed to apply to businesses using the phone lines. Now, according to their spokesperson, the tariff may also be applied to computer enthusiasts. The rationale Southwestern Bell's Debbie Michaels gave is that modems "tie up lines."

Back in 1966, more than a decade before the personal computer, a modem required a special "data-grade" line. But today's personal computer modems operate just fine on normal "voice-grade" lines. So, while back when the tariff was passed there was an expense the phone company had to recoup, there is no such expense today. And, while some computerists may indeed modem away for hour after hour, the majority do not. If you call a network, you are billed an hourly charge of from \$5 to well over \$100. If you call an out-of-town bulletin-board system, you must pay all long-distance rates.

The phone company may complain that Robert, for example, was "tying up" their phone lines. But then, how many people in Norman generate calls from as far away as Hull, England?

And, as Compuserve's Rich Baker pointed out, "It's not fair for the phone company to single out users of mod-

ems." In other words, there are probably more teen-agers tying up more phone lines than there are modems.

So the tariff seems to be asking people to pay more money for no additional services in order to offset arguably nonexistent, inapplicable or unfairly calculated expenses.

### The coming fight

We talked with Pat Petree at Oklahoma's Corporations Commission, the regulatory body overseeing the phone company. He told us that, as things stand, Southwestern Bell is within their rights to apply the tariff.

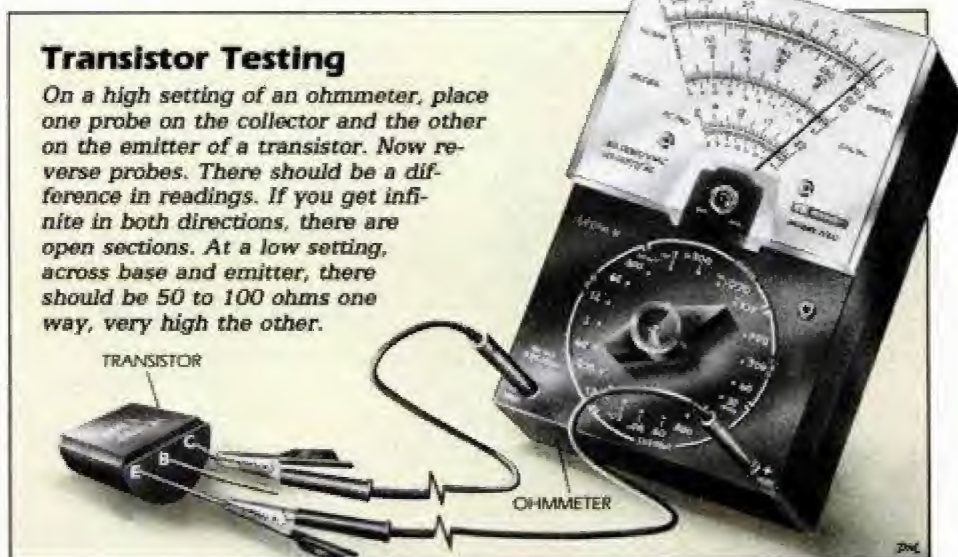
Asked to comment on whether the tariff seemed fair, he replied the commission must have hearings to decide that, and that right now he didn't "know what a computer is, or a modem." He will likely find out soon.

Robert plans to appeal the decision but has decided for now to pay to keep his bulletin board running. (You can reach his system at (406) 360-3020). Meanwhile, he and other members of OMUG (Oklahoma Modem Users' Group at Box 5981, Norman, Okla. 73070) are attempting to raise a legal fund to fight Southwestern Bell.

The outcome of this fight will someday have a direct impact on just about everyone. At this point, the wagons are just beginning to form a circle. **PM**

### Transistor Testing

*On a high setting of an ohmmeter, place one probe on the collector and the other on the emitter of a transistor. Now reverse probes. There should be a difference in readings. If you get infinite in both directions, there are open sections. At a low setting, across base and emitter, there should be 50 to 100 ohms one way, very high the other.*





# PM SOFTWARE MONITOR



## It's more than a nightmare



A map and counters are used to keep track of your robots when playing *Suspended* (above). In this text-style adventure, you must save the world by fixing its computers.

In the world of the future a sleeping man is king. The man who is chosen is stored, in cryogenic suspension or frozen sleep, deep in the underground vaults that house a Utopian society's complex computer systems. Should

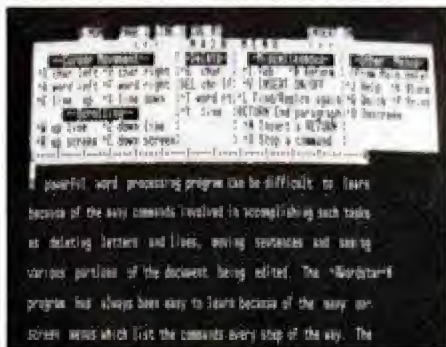
anything go wrong with these computers, which control everything from the weather to traffic patterns in the world above, then the frozen king will awaken—and it will be his job to find out what went wrong and learn how to fix

it. Drafted into this somewhat less than enviable position, you one day awake to the clamor of loud alarms, and the coldness seeps gradually from your limbs. The computers are down. It is up to you to fix them. Should you fail, the police will arrive with your replacement, and they don't replace a live failure. So, even if you're less than thrilled with this society which condemned you, you will do your best to save it.

You cannot go physically into many of the areas in the complex. But you do have six robot servants, all with different personalities and powers that are yours to command. To keep track of the robots' locations you have a mapboard and counters. Your orders are input through the keyboard of what looks very much like an ancient personal computer (just about any of the ones popular in the old days of the mid-1980s). The screen shows you each robot's conversational response. But it's up to you to figure out how best to use the robots to solve the puzzle.

From Infocom at \$59.95 on disk, *Suspended* is one of the most extraordinary adventure games on the market.—N.S.

## New version of Wordstar



Menus in *Wordstar* are helpful lists of commands. Main menu is on white background.

A powerful word processing program can be difficult to learn because of the many commands involved in accomplishing such things as deleting letters and lines, moving sentences and seeing various portions of the document being edited.

The *Wordstar* program from Micro

Pro has always been easy to learn because of the many on-screen menus which list commands at every step.

The newest version, the 3.3, continues the menus and adds function keys for the IBM PC and Apple IIe (with Z/80 CP/M card added).

These function keys allow you to define a command, which might take many keystrokes, as just one key. The IBM PC, of course, has its own separate function keys on the keyboard. The Apple IIe, on the other hand, has no function keys as such. So, on the Apple, the top keys (numbers) are treated as function keys if the Apple's special closed-apple or open-apple keys are held down. On both computers the function keys can be redefined. This new version may be available for other computers by the time you read this.

*Wordstar* is just about the most powerful word processor you can buy. Now, it's even easier to learn and to use.—N.S.

## In the arena



Seen from directly overhead, two gladiators clash and fight in the game of *Bilestoad*.

*Bilestoad* from Datamost (\$39.95 for the Apple II) is an exciting new game of personal combat. Two futuristic gladiators, seen from directly overhead, may be manipulated by two humans, or one may fight the computer's champion. It's the best and most colorful such item that we've seen.—N.S.





# SHAVE \$200

**DIRECT FROM  
ROCKWELL  
INTERNATIONAL.**

Now you can own the Rockwell 13" Planer for less. It's the tough little brother to the legendary line of bigger Rockwell Planers. With no compromises in construction, design, or performance. And from August 1 through December 31, 1983, it's yours for \$200 less than its regular price.

### **IRON-CLAD TOUGHNESS.**

Consider our construction. Where some planers use cast aluminum, we use high-tensile cast iron. So the Rockwell 13" is heavier. More stable. More accurate. And much more durable. Yet, at 290 pounds, it's still light enough to move to a job site.

### **A REALLY SMART HEAD.**

Now consider design. Unlike some other planers, our table remains stationary while the head adjusts up or down. Faster and more sensible, especially when feeding long stock.

### **NON-STOP POWER.**

Regarding performance, the Rockwell 13" has a constant-duty induction

CUTS STOCK UP TO 13" x 5.9" x 3/16"  
FEED RATE: 13 1/2 fpm.  
CUTTERHEAD SPEED: 4500 rpm.  
MOTORS: 2 hp, 1Ø or 3 hp, 3Ø.

motor driving a 3" diameter cutterhead through a triple belt drive. Where some planers don't give you a choice, you can order ours in single or three phase. And ours has an oil-bath feed gearbox with quick disengage. Some planers settle for less.

### **SURPRISINGLY AFFORDABLE.**

The Rockwell 13" Planer is always a good buy. And now through December 31, 1983, you can make a good buy even better with a \$200 rebate check direct from Rockwell International (good on Models 22-651 and 22-655).

To find out how to get your rebate check, see your Rockwell distributor or call Rockwell Power Tool

Division toll-free 800-438-2486 (in PA 800-438-2487) for more details.

## **THE ROCKWELL 13" PLANER**



**Rockwell  
International**

...where science gets down to business

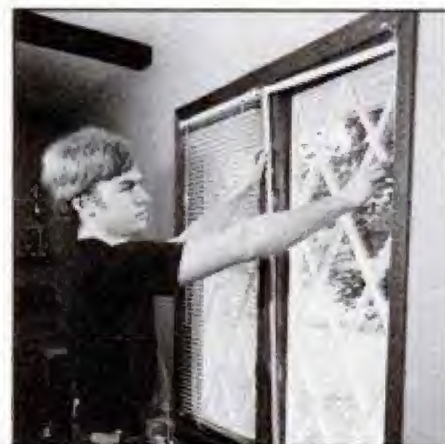




The attic floor is one of the most important areas to insulate to retain rising heat. We put additional fiberglass insulation perpendicular to the trusses so there were no gaps.



To close gaping holes, foam sealant worked the best, but it was hard to control in narrow confines. To seal smaller leaks at windows and doors, we used caulk in a gun.



A magnetic strip on the frame of this interior storm window is attracted to a self-adhering steel strip around the primary frame. This keeps the storm in place.

# Buttoning Up An Energy Sieve

We chart the progress of one do-it-yourselfer as he makes his home more energy efficient.

**F**rom the standpoint of energy conservation, this sprawling 4,000-sq.-ft. ranch house had little going for it. It was an all-electric house when electricity costs were at an all-time high. It had a 70-ft.-long hallway running its length which acted as a wind tunnel, and cathedral ceilings in the living room and master bedroom. The seven-bedroom house rested on a cement slab, except for a bedroom in the west corner built over a basement.

Your home may not be in such dire straits. However, some of the solutions for cutting this homeowner's astronomical heating bills may work for you.

The first step to conserving energy is to have an energy audit. This points out places where energy is lost, and ranks the practices and measures you should take in order of their cost effectiveness.

We asked two energy auditors to look at the house and offer suggestions for saving energy. One is an auditor at Jersey Central Power and Light Co. (JCP&L) and the other is a construction consultant.

## Inexpensive practices

The auditor from JCP&L went through a checklist of possible energy-wasting areas. The first part of the list involved energy-conservation practices—low-cost or no-cost steps you can take yourself to reduce energy use and costs immediately.

Practices that could be adopted by this homeowner were: reducing the water heater temperature to 120° F. (the dishwasher had a temperature booster to further heat water), install-

*(Please turn to page 50)*



To reduce heat-cold transfer, the exterior and interior surfaces of this storm door frame are separated by a polyurethane barrier. The glass panel is double-glazed.



# Save Gas, Save Engine with 'POLY'

The following introduces one of the most fully tested and credentialed gas-saving, friction-reducing engine treatments ever to reach the market!

**WHAT IS POLY?** "Poly" is short for polytetrafluoroethylene (TFE). It is the slipperiest substance known to man (1981 Guinness Book of World Records, p. 188). The Petrolon Corporation, makers of Slick 50, has invented a way to permanently bind this slippery chemical to your engine with one treatment. All you do is add one quart of Slick 50 to your oil during oil and filter change. By reducing engine friction, Slick 50 increases gas mileage and horsepower and reduces engine operating temperature, thus causing your oil and engine to last longer. Just as important, it reduces metal wear, defraying costly overhauls.

**HOW DO I KNOW THIS ISN'T A FRAUD?** Slick 50 has some very impressive credentials. The "Consumers Digest" magazine (March/April, 1982, p. 35) states "Slick 50 does reduce engine heat and ordinary wear, and our informal tests indicate that it will improve gas mileage by about 2 or 3 miles per gallon." Researchers at the Franklin Institute Research Laboratory, after applying a powerful ultrasonic cleaning process to a Slick 50 treated engine, were surprised at its permanence. They stated, "We actually expected the Petrolon Slick-50 TFE Resin coating to also be removed, but later found it was still there."

The FAA (Federal Aviation Administration) has fully accepted Slick 50 Aircraft Piston Engine Treatment (F.A.R. #33.49). An FAA test simulating 1400 hours of engine use (equivalent to about 70,000 miles on a car) showed almost zero engine wear!

2500 miles after removing Slick 50 from the crankcase, lab tests at a leading university engineering experiment station showed that the benefits of Slick 50 were still there. They reported a horsepower increase of 16.9% and 9.9% for light and heavy loading respectively. The senior engineering researcher at the University of Southern California in San Diego stated this, "Slick 50 does increase horsepower and decreases fuel consumption in tests done at the university." The Space Shuttle Columbia uses the chemical "poly" in its gears and bearings because it is the only chemical lubricant which can withstand the heat and corrosive elements of space.

Perhaps most dramatic of all is a tor-



ture test overseen by the Automotive Services Council for Pennsylvania and shown on television station WTVE. Three cars with between 75,000 and 129,000 miles on them were treated with Slick 50. Six months later the oil was drained from each vehicle, and the cars were driven without the oil plugs for about a half hour. The water temperature never rose, and the engines sustained no apparent damage. There are many more tests available. If you are still skeptical, send \$2.00 to defray printing and postage costs, and we will send you additional, more detailed test information, etc.

**HOW DO YOU TREAT AN ENGINE?** Very simply. A few minutes before oil and filter change, add engine flush (sent free with each order) to clean out the engine. Let the engine idle for 10 minutes. Then drain the oil, change the filter, and add the proper amount of oil less one quart. Add one quart Slick 50, drive for 30 minutes, and leave it in the crankcase for 3,000 miles. As the engine operates, the oil carries the polytetrafluoroethylene between the parts where it is burnished into the pores of the metal. Once impregnated, it is permanent, so you do it only once, not each time you change oil. One quart of Slick 50 will treat all standard 4-, 6-, and 8-cylinder gasoline and diesel engines.

**WILL IT WORK WITH MOST OILS?** Yes, Slick 50 will work with all petroleum-based oils and all synthetics that are compatible with petroleum-based

oils. An exception is graphite oils. However, once an engine is treated, you can go back to a graphite type if desired.

**WHAT ARE THE BENEFITS OF SLICK 50?** Your actual benefits in percentages may vary, depending on the kind of driving you do, vehicle condition, weather, and geographic area. By reducing friction, Slick 50 does all of the following: It increases gas mileage. It increases horsepower—small economy cars and large RV's really need this! It reduces operating temperatures, thus increasing the lubrication and life of the oil and the engine. Last but not least, the drastic reduction in engine wear defrays or eliminates costly overhauls which could save you up to \$1,000. Slick 50 eliminates the "lubrication starvation" that all cars experience when first started before the oil has a chance to circulate. Up to 90% of the engine wear on a car can be caused by this lubrication starvation. You receive all of these benefits for \$33.95, less than the cost of two tanks of gas.

**WILL SLICK 50 HARM MY ENGINE OR AFFECT MY WARRANTY?** No! Slick 50 is suspended in an excellent grade of petroleum oil which meets or exceeds every manufacturer's engine warranty requirements. In addition, Slick 50 is the only product of its kind to have both an API (American Petroleum Institute) and an SAE (Society of Automotive Engineers) rating imprinted on the package. It also has a SF-CC-CD service classification.

**ARE DEALERSHIPS AVAILABLE?** Yes. Here's an opportunity to make handsome profits. Having such solid test results from major institutions makes Slick 50 easier to sell than many other products. Free dealership information is sent upon request.

**Free engine flush sent with each order. Free shipping with orders of 2 or more.**

**For purchase or further information, call toll-free 1-800-525-8624 (in Colorado call 1-303-762-1385) or send to SLICK 50, 3148 S. York St., Englewood, CO 80110.**

☐ I enclose \$33.95 + \$3.00 shipping and handling.  
☐ I want 2 or more (free shipping and handling).  
☐ Check    ☐ C.O.D.    ☐ Visa/MasterCard  
 Card No. \_\_\_\_\_ Exp. Date \_\_\_\_\_  
 Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 (Give street address if possible for UPS delivery)



# EARN UP TO \$12 AN HOUR

## IN YOUR OWN SPARE TIME or FULL TIME

### SHARPENING BUSINESS!

#### ON OUR 30-DAY FREE TRIAL OFFER

**LIFETIME  
SECURITY**  
with  
YOUR OWN  
BUSINESS

You risk nothing by accepting this offer to see how easily you can turn your spare time into big Cash Profits with your own Complete Sharpening Shop. No selling, no previous experience needed. Our famous Sharp-All and show-how instruction set you up to make \$200, \$500, \$700 a month CASH sharpening Saws, Knives, Scissors, Lawnmowers, Shop and Garden Tools... all cutting edges.



**FREE BOOK!**  
Gives  
Full  
Details

Send for all the facts! Our free Book tells how to start a profitable, lifetime home sharpening business, how we help you grow, how we'll finance you.

Send for FREE details — mail coupon below or postcard TODAY! Foley Belsaw Co., 80249 Field Building, Kansas City, Mo. 64111

**No Obligation...No Salesman Will Call**

YES, ☐ FOLEY BELSAW CO. 80249 FIELD BLDG. KANSAS CITY, MO. 64111  
please send me the **FREE BOOK** that gives full details.

Name \_\_\_\_\_ Please Print \_\_\_\_\_  
Address \_\_\_\_\_  
City/State \_\_\_\_\_ Zip \_\_\_\_\_

## WOODWORKERS Do-it-Yourself CATALOG

### with 20 WOOD SAMPLES

104 giant pages

—14 kinds cabinet and furniture woods, 79 veneers in 3-ft. lengths, 19 flexible veneers to 36" wide x 8 ft., 11 fancy burl & crotch, 54 sizes, kinds carving blocks, 76 assembled inlays, 72 lamp parts, 39 clamps, 118 carving tools & chisels, 73 wood picture kits, 500 plans, 96 how-to books. Pic. framing, carved molding, period hardware, sliding, revolving hdwe. Cane, reed, wood finishes, coffee mill kit, clock parts, etc. Over 2,000 hard-to-find products in new Woodworker Catalog!



TEAR OUT AD. MAIL TODAY.  
**CONSTANTINE** Est. 1812  
2051 Eastchester Road, Bronx N.Y. 10461

☐ Enclosed \$1 for Catalog without samples.

☐ I prefer Catalog with 20 Wood Samples. \$2 enclosed. Send 20 wood veneers from around the world. Identified. Useful when matching, naming & ordering fine woods. Educational. \$1.50 refunded on first catalog order.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
Zip \_\_\_\_\_

## ENERGY SIEVE

(Continued from page 48)



Replacing a hollow-core door leading to the garage with this insulated steel door will help retain heat indoors. We also moved entry out to gain interior space.



Foundation insulation is applied to reduce heat loss through the block. Since the insulation was thicker than the siding, we added protective top trim.

ing water-flow restrictors on shower heads, installing insulation behind electrical outlets and switch plates, and adding an insulation cover over the attic stairs. A faucet leak, small as it may be, is an energy waster. A leak was repaired with a new washer. Dusty baseboard heaters which impede operating efficiency were vacuumed.

Other low-cost practices that didn't pertain to this household, but may to your family, include lowering the thermostat to 55° F. when your family is out of the house for four hours or more. Also, consider reducing the oil burner firing rate to the proper level after you've made your home more energy conservative by sealing the house shell.

### Measures that pay off

A prepared list of energy measures to reduce heat loss and cold air infiltration through the roof, walls, floor, windows and doors was checked by the utility auditor. A chart showing the energy-saving steps we took is on page 52. It includes the approximate payback time of each step.

The addition of a solar water heater



An uninsulated north wall is protected easily with rigid insulation installed over the drywall. Gypsum wallboard at least 1/2 in. thick must cover the insulation.



This attic stairs cover (mounting frame included) zippers shut to seal off the attic opening. The cover prevents warm air from leaking out of the house into the attic.



After sealing the house, the next step was to divide it into three heat zones separated by doors. This pair, placed in a high-traffic area, slides open for safety. We also used swinging and bi-fold doors of the same type. Although the doors are solid wood and effectively seal off an area, the lowered look lightens their appearance.

at a contractor-installed cost of \$5,150 for a 9½-year payback was the only improvement suggested by the utility

(Please turn to page 52)



# Know your car inside and out.

Know how to fix it...to tune it...to service it...to keep it running right. The TOTAL SERVICE MANUAL for your car will show you how to do everything from a minor adjustment to a major repair.

CREDIT CARD ORDERS & CUSTOMER SERVICE

call 1-800-CAR-BOOK

IN NEW YORK 516-676-8043

IF YOU DON'T SEE IT HERE, PLEASE ASK FOR IT

FREE CATALOG WITH EVERY ORDER

## TOTAL SERVICE MANUALS

SATISFACTION GUARANTEED OR YOUR MONEY BACK



1713	ALFA ROMEO 62-78 for all models	\$12.95
9641	ALFA ROMEO ALFETTA 73-80 for all models	\$12.95
9677	AMC GREMLIN, HORNET, PACER 71-80 for all models	\$12.95
8194	AMC 75-82 covers AMC Concord, Eagle, Mustang, Spirit plus	\$12.95
0991	ARROW, PLYMOUTH 76-80 covers all models	\$12.95
9404	ASPEN, DODGE 76-79 covers all models	\$12.95
7122	AUDI 100 70-77 for all models inc 100L	\$12.95
1229	AUDI 4000 80-82 covers all sedan & coupe models	\$12.95
0664	AUDI 5000 77-79	\$12.95
0276	AUDI FOX 73-79 covers all models	\$12.95
0379	BARRACUDA & CUDA 65-72 for 6 & V8 models	\$10.95
1042	BMW 2002 59-77 inc 1500, 1600, 1802, 2000 except CS	\$12.95
9813	BMW 326 75-82 covers all models	\$12.95
8199	BMW 528i, 530i 75-80 covers all models	\$12.95
9760	BMW 2500, 2800, 3.0 all models incl Bavaria & CS	\$12.95
0504	BRONCO, FORD 66-81 for all 2 & 4 wheel drive models	\$10.95
6308	BUICK 68-76 incl Electra, Le Sabre, Riviera, Wildcat	\$12.95
8473	BUICK 77-83 for all full size incl Electra & Le Sabre	\$10.95
8082	BUICK REGAL & CENTURY 74-80 for all models incl turbo	\$12.95
9851	BUICK SKYLARK 82 for all models + Cadillac Cimarron	\$12.95
0727	CADILLAC 66-74 all models except El Dorado	\$12.95
8678	CAMARO 67-81 covers all 6 & 8 cylinder models	\$12.95
8460	CAMARO 82-83 covers all models	\$10.95
9557	CAMRI 70-76 for all 2000, 2600, 2800 models	\$12.95
6021	CAPRI 326 75-82 covers all models and engines	\$12.95
0379	CHALLENGER 70-72 covers all 6 and V8 models	\$10.95
8466	CHAMP & SAPPORO 77-81 covers all engines & models	\$10.95
8331	CHARGER 67-70 for all models inc 500 & R/T	\$10.95
8212	CHARGER 71-75 covers all models	\$10.95
9851	CHEVROLET CAVALIER 82 for all models + Pontiac J2000	\$12.95
8465	CHEVROLET CELEBRITY 82-83 all models plus Buick Century	\$10.95
0383	CHEVETTE 64-69 covers all Malibu models	\$10.95
8469	CHEVETTE 70-81 covers all Malibu, Monte Carlo, El Camino	\$12.95
0838	CHEVETTE 76-82 covers all models	\$12.95
1038	CHEVROLET 79-80 covers all 6-cyl models	\$18.00
0888	CHEVROLET 49-54 reprint of factory shop manual	\$20.00
5001	CHEVROLET 55-65 for all Bel Air, Biscayne, Impala models	\$12.95
0919	CHEVROLET 66-81 for all Bel Air, Biscayne, Caprice, Impala	\$12.95
9148	CHEVROLET CITATION 80-81 also models plus Buick Skylark	\$10.95
8187	CHEVY 62-68 covers all 4, 6 & V8 models	\$10.95
0779	CHEVY LUV 72-82 for all 2 & 4 wheel drive + diesel	\$12.95
8464	CHEVY S-10, S-15 PICK-UP 82-83 for all models plus GMC	\$10.95
8154	CHEVY PICK-UP 67-82 all models inc Blazer, GMC plus Suburban	\$12.95
1662	CHEVY VANS 67-82 for all models plus GMC vans	\$12.95
0020	CHRYSLER 73-79 factory shop manual must give year	\$23.95
9588	CITROEN CX 65-75 covers all DS19, 20, 21 models	\$12.95
8264	COLT & CHALLENGER 71-81 covers all models	\$10.95
8211	COMET 70-77 covers all models	\$10.95
8212	CORONET, DODGE 71-75 covers all models	\$10.95
8032	CONVAIN 60-69 covers all models inc turbocharged	\$10.95
0478	CORVETTE 57-65 covers all 283 & 327 models	\$12.95
9481	CORVETTE 66-82 covers all models & engines	\$12.95
1756	CRICKET, PLYMOUTH 70-73 also covers Hiram's Avenger	\$12.95

## GENERAL REPAIR MANUALS — TUNING GUIDES — HOME REPAIR — TECHNICAL BOOKS

8292	WORLD CARS 1983 pict. book into every '83 car in world	\$39.95
0575	CHILTON AUTO REPAIR 76-83 for all American cars	\$18.95
0932	CHILTON AUTO REPAIR 72-79 for all American cars	\$19.95
7137	CHILTON AUTO REPAIR 64-71 for all American cars	\$19.95
1763	CHILTON AUTO REPAIR 54-63 for all American cars	\$19.95
7111	CHILTON TRUCK REPAIR 75-82 American & import models	\$19.95
8561	CHILTON TRUCK REPAIR 64-71 for all 1/2, 3/4, 1 ton models	\$19.95
8091	CHILTON IMPORT CAR MANUAL 76-83 for ALL major makes	\$19.95
0492	AUTO REPAIRS & PRICES Set rate times 74-79 U.S. cars	\$7.95
0406	AUTO MECHANIC certification tests, complete prep course	\$7.95
0653	AUTOMOTIVE OSCILLOSCOPE how to use manual for mechanics	\$8.95
1165	GM CARS Diagnostic & Repair 70-83 plus light trucks	\$14.95
1146	PERFORMANCE WITH ECONOMY power from tuning & building	\$10.95
0654	AUTO AIR CONDITIONING technical school training manual	\$21.95
7125	AUTO AIR CONDITIONING service & repair all	\$8.95
8226	TRANSISTOR IGNITION SYSTEMS covers them all	\$8.95
7110	WEEKEND MECHANIC'S HANDBOOK ideal manual for beginner	\$11.95
9622	HOW TO TUNE YOUR CAR good for all cars	\$7.95
9671	BASIC MAINTENANCE & REPAIR keep your car running right	\$4.95
7172	BASIC AUTO REPAIR Manual a must for any car	\$5.95
1706	BASIC CHASSIS, SUSPENSION, BRAKES tune & service	\$6.95
1708	BASIC IGNITION & ELECTRICAL SYSTEMS	\$6.95
0680	BASIC AUTO TROUBLESHOOTING for all cars	\$6.95
3759	BOSCH ELECTRONIC FUEL INJECTION manual 70-79 imports	\$10.95
7111	BASIC CARBURETORS & FUEL SYSTEMS for all U.S. makes	\$6.95
9576	CARBURETOR BASICS troubleshooting/rebuild all U.S. makes	\$8.95
0882	CARTER carburetors rebuild, tune, modify all models	\$10.95
9411	HOLLEY carbs. 2 & 4 cyl. tune & rebuild	\$9.95
9652	HOLLEY carburetors for all 1, 2 & 4 barrel models	\$9.95
1707	BASIC BODYWORK & PAINTING good overall information, pict.	\$6.95
0827	AUTOMOTIVE REFINISHING best professional paint book	\$8.95
5104	AUTOBODY REPAIRING & REPAINTING the best	\$14.95
1659	AUTO BODY SHEET METAL REPAIR for professionals	\$14.95
5106	GLASS FIBER AUTO BODY construction & repair	\$6.00
8470	FIBERGLASS repair & construction for cars & boats	\$10.95
8354	CUSTOMIZE YOUR VAN step-by-step how to Chevy, Dodge, Ford	\$8.95
3726	ENGINE SWAPPING latest techniques with actual swaps	\$8.95
8491	PRACTICAL ENGINE SWAPPING how to do it right	\$7.95
6029	DIESEL GUIDE covers everything owner/buyer should know	\$8.95
7128	DIESEL, How to convert your car, van, pickup to	\$7.95
8432	DIESEL ENGINES, HOW TO REPAIR, complete training course	\$10.95
0667	DIESEL Fundamentals, Service, Repair covers all aspects	\$10.95
2526	ENGINE REBUILDING all U.S. & imports, gas & diesel	\$14.95
7170	BASIC CLUTCHES & TRANSMISSIONS, good book on subject	\$4.95
9320	AUTOMATIC TRANS SERVICE 68-79 all Ford & GM models	\$14.95
1749	AUTOMATIC TRANS REPAIR 74-80 AMC, Chrysler, Ford & GM	\$14.95
1223	BRAKES, STEERING, SUSPENSION service all U.S. cars	\$14.95
9780	AUTO RESTORATION GUIDE, best ever published 291 pgs	\$15.95
0995	CAR INTERIOR RESTORATION useful for all cars	\$6.95
0906	OLD CAR VALUE GUIDE latest edition	\$9.95
0706	BYPASS EMISSION CONTROLS 73-77 all Ford built cars	\$15.95
8474	BYPASS EMISSION CONTROLS 71-77 GM cars	\$14.95
0813	V-6 PERFORMANCE from Buick, Ford & Chevy V-6 engines	\$10.95
9534	BUICK POWER MANUAL performance tuning the V6 models	\$8.95
0830	CHRYSLER SUPER SPORT 61-76 everything about every model	\$14.95
9795	CHEVY PERFORMANCE getting the most from small blocks	\$10.95
8125	CHEVY SMALL BLOCK, how to rebuild	\$9.95
9409	CHEVY SMALL BLOCK, how to rebuild	\$7.95

8185	DART & DEMON 68-76 covers all models	\$10.95
9592	DATSUM 200SX 80-81	\$12.95
8065	DATSUM 1200 & B210 71-78 covers all models	\$12.95
0783	DATSUM 210 79-82 covers all models imported	\$12.95
8127	DATSUM 240Z, 260Z, 280Z 70-78 covers all models	\$12.95
9152	DATSUM 280ZX 79-82 for all models inc turbo	\$12.95
1657	DATSUM 310 76-81 covers all models plus F-10	\$12.95
9583	DATSUM 510, 610, 710 68-77 covers all models	\$12.95
1258	DATSUM 311 sports car 1500/2000 SPL & SRL models	\$20.95
9297	DATSUM PICK-UP 70-79 covers all 2 wheel drive models	\$12.95
0925	DATSUM PICK-UP 80-82 for all 270 models, 2 & 4 wheel drive	\$12.95
0871	DODGE 68-77 for all Monaco & Polara models	\$10.95
8066	DODGE ARIES 81-82 covers all models	\$12.95
1259	DODGE DASH 78-82 covers all models inc D124	\$12.95
8371	DODGE 311 sports car 1500/2000 SPL & SRL models	\$10.95
1298	DODGE DICK-UP 71-81 for all 2 wheel drive models	\$12.95
9497	DODGE DICK-UP 79-81 for all 2 wheel drive models	\$10.95
8203	DODGE VANS 67-70 for all 1/4, 1/2, 3/4 & 1 ton models inc Plymouth	\$10.95
6070	DODGE VANS 71-82 covers all models to 1 ton plus Plymouth	\$12.95
8192	DUSTER 70-76 for all models inc Scamp	\$10.95
9688	ESCORT 81-82 covers all models plus Mercury Lynx	\$12.95
8189	FAIRLAME, FORD 62-70 covers all models	\$10.95
8366	FAIRMONT, FORD 78-81 covers all models and engines	\$12.95
9874	FALCON, FORD 64-70 covers all 6-cyl models	\$10.95
9776	FIAT 124 67-82 all models inc spyder, coupe, 2000 & turbo	\$12.95
9640	FIAT 128 72-79 for all models inc SL & Rally	\$12.95
8106	FIAT 131 75-80 for all models, 1.8 & 2.0 liter engines	\$12.95
0399	FIAT X1/9 71-82 covers all models	\$12.95
6022	FIAT STRADA 79-80	\$12.95
1073	FIESTA, FORD 78-80 covers all models	\$12.95
0675	FIREBIRD 67-69 covers all models	\$12.95
6309	FIREBIRD 70-81 covers all models inc Trans Am	\$12.95
9611	FORD 71-82 covers Elite, LTD, LTD II, Ranchero, Thunderbird	\$10.95
0872	FORD 68-83 for Custom, Galaxie, LTD, XL & wagon models	\$10.95
9369	FORD COURIER 72-82 covers all models imported	\$12.95
8205	FORD PICK-UP 65-68 for all 2 & 4 wheel drive models, 1/2-1 ton	\$10.95
8458	FORD PICK-UP 73-79 for all 2 & 4 wheel drive F-100 to F-350's	\$12.95
0451	FORD PICK-UP 69-83 for all 2 wheel drive, F-Series & diesel	\$12.95
8204	FORD VANS 61-68 for all 1/4, 1/2, 3/4 & 1 ton models	\$10.95
0453	FORD VANS 69-82 covers all 6 & 8 cylinder models	\$12.95
9436	GRAMADA, FORD 75-83 covers all models	\$10.95
0885	HONDA ACCORD 76-81 for all models inc Prelude	\$12.95
8694	HONDA CIVIC 73-81 covers all models inc Civic	\$12.95
8206	INTERNATIONAL SCOUT 67-73 800, A, B, X models	\$10.95
8565	INTERNATIONAL 62-80 line/maintenance Scout, wagon, pick-up	\$10.95
1043	JAGUAR E-TYPE 61-72 covers all 6-cylinder models	\$12.95
9612	JAGUAR E-TYPE V12 71-74 covers all models	\$12.95
9399	JAGUAR XJ6 68-79 covers all models	\$12.95
9617	JAGUAR XJ12 72-80 for all models inc XJS, Daimler	\$12.95
9769	JEEP 50-65 for 4 & 6 cyl station	\$19.95
8207	JEEP 66-79 for all Cherokee, Commando & Wagoneer models	\$10.95
9805	JEEP WAGONEER 70-81 covers all models with 230 ohc eng.	\$19.95
9806	JEEP UNIVERSAL C-2, C-3, C-30 reprint factory manual	\$19.95

8155	JEEP 68-81 for all CJ-5, CJ-6 and CJ-7 models	\$12.95
0596	LANCIA BETA 76-80 for sedan, coupe & HPE models	\$12.95
1254	LANDROVER 59-77 covers 2, 2A, 3 gas & diesel models	\$12.95
0481	MAVERICK 69-71 6 cyl, 170, 200, 250 cu in eng.	\$10.95
8211	MAVERICK 72-77 covers all models	\$10.95
1550	MAZDA GLC 77-82 for all rear wheel drive models	\$12.95
0812	MAZDA GLC 81-82 covers front wheel drive models only	\$12.95
0444	MAZDA 71-78 includes RXA and Cosmo models	\$10.95
9941	MAZDA RX7 79-81 covers all models	\$12.95
8105	MAZDA 626 79-81 covers all models	\$12.95
0593	MAZDA 808, 818 72-78 covers all models	\$12.95
1746	MERCEDES-BENZ 220 59-65 covers all models	\$12.95
8197	MERCEDES-BENZ 250 65-68 plus 1900, 2000, 2200 diesels	\$12.95
9485	MERCEDES-BENZ 250, 280 68-72 all models plus 230	\$12.95
0416	MERCEDES-BENZ 68-73 incl 220, 230, 300 & diesel models	\$12.95
8308	MERCEDES-BENZ 350, 450 71-80 for 350S, 450SE, SL, SLR	\$12.95
8439	MERCEDES-BENZ 74 79 incl 230, 240, 280, 300 & diesel	\$12.95
9436	MERCURY MONARCH 75-80 covers all models	\$10.95
0527	MERCURY ZEPHYR 78-81 all models inc turbocharged	\$12.95
1098	MG MIDGET 68-80 all models plus A-H Sprite 58 71	\$12.95
1720	MGB, MGBGT 68-81 for all roadster & coupe models	\$12.95
0884	MONZA, CHEVROLET 75-80 plus Astro, Starfire, Skylark	\$10.95
0479	MUSTANG 68-73 covers all models	\$12.95
8272	MUSTANG II 74-78 covers all 4, V6, & V8 models	\$12.95
9386	MUSTANG 79-82 covers all engines and models	\$12.95
0951	NOVA, CHEVROLET 71-79 covers all models	\$12.95
7107	OLDS CUTLASS 70-83 for all rear wheel drive models	\$12.95
8465	OLDS CUTLASS CIERRA 82-83 all models plus Oldsmobile 6000	\$10.95
9451	OLDS FIRENZA 82 for all models plus other GM cars	\$12.95
9148	OLDS OMEGA 80-81 all models plus Pontiac, Phoenix	\$10.95
8308	OLDSMOBILE 68-75 covers all 88 and 98 models	\$12.95
8473	OLDSMOBILE 77-83 covers all 88 and 98 models	\$10.95
8273	OLPE 66-75 for all models inc Kadett & Monte	\$12.95
9589	OLPE GT 68-73 covers all 1900 models	\$12.95
0711	PEUGEOT 504 DIESEL 74-80 covers all models	\$12.95
7124	PEUGEOT 504 68-79 for all gasoline engine models	\$12.95
0883	PINTO 70-80 covers all models inc Mercury Bobcat	\$10.95
0874	PLYMOUTH 68-76 Fury, VIP, Gran, Suburban models	\$10.95
1259	PLYMOUTH HORIZON 78-82 covers all models inc TC3	\$12.95
0666	PLYMOUTH RELIANT 81-82 covers all models	\$12.95
0851	PONTIAC 66-76 all full-size inc Bonneville, Catalina, GP	\$12.95
8473	PONTIAC 77-83 all full size inc Bonneville, Catalina, GP	\$10.95
0499	PONTIAC TEMPEST 68-73 all models inc GTO, Le Mans	\$10.95
9535	PORSCHE 911 65-82 covers 911, 911E, 911S, 911SC & 911T	\$12.95
9834	PORSCHE 914 70-76 all models inc 914/6	\$12.95
0293	PORSCHE 924 76-80 covers all models inc Turbo	\$12.95
8008	PORSCHE 928 78-81 also covers 924	\$11.95
0372	RENAULT LeCar 75-81 covers all models inc 95	\$12.95
9479	RENAULT 12 69-79 covers all models inc auto trans	\$12.95
0645	RENAULT 15, 17 71-79 covers all models inc T1, T5	\$12.95
0395	ROADRUNNER & SATELLITE 68-73 all models	\$10.95
0750	SAAB 99 69-79 covers all models	\$12.95
8058	SUBARU 72-82 for all 1300-1800, BRAT and MPV models	\$12.95
6030	SUBARU 78-83 reprint factory manual for all models	\$21.95
8189	TORINO 68-75 all models inc Elite, Ranchero	\$10.95
0829	TOYOTA CELICA 71-81 covers all models except Supra	\$12.95
9812	TOYOTA COROLLA 68-82 for all models inc 5-speed trans	\$12.95
7132	TOYOTA CORONA 70-82 covers all 4-cyl models	\$12.95
8198	TOYOTA CRESSIDA 78-82 covers all models	\$12.95
0647	TOYOTA PICK-UP 68-82 for all 2 wheel drive models	\$12.95
8524	TOYOTA LAND CRUISER 66-77 covers all models	\$12.95
0923	TOYOTA STARLET 78-81 covers all models	\$12.95
0576	TOYOTA SUPRA 79-81 covers all models	\$12.95
0901	TOYOTA TERCEL 80-82 covers all models	\$12.95
1200	TRIUMPH SPITFIRE 62-81 covers all models	\$12.95
1015	TRIUMPH TR5, TR6, 67-76 all models inc TR250	\$12.95
8693	TRIUMPH TR7 75-81 covers all models	\$12.95
8192	VALIANT 68-76 all models inc Scamp, Signette	\$10.95
0884	VEGA 74-77 all models inc Monza except Cosworth/Vega	\$10.95
8019	VOLARE 76-80 covers all models	\$10.95
1227	VOLKSWAGEN BEETLE 54-67 all models inc Karmann-Ghia	\$12.95
0140	VOLKSWAGEN BEETLE 68-77 all models inc Karmann-Ghia	\$12.95
8300	VOLKSWAGEN RABBIT 75-82 gas & diesel plus pick-up	\$12.95
8294	VOLKSWAGEN SCIROCCO 75-82 covers gas & diesel models	\$12.95
8383	VOLKSWAGEN JETTA 80-81 gas engine + other VW models	\$12.95
1125	VOLKSWAGEN VAN 61-79 all camper, van, transporter models	\$12.95
9626	VOLKSWAGEN BUGATTO 80-81 covers all models	\$12.95
9582	VOLKSWAGEN TYPE 3 62-73 for squareback, fastback	\$12.95
9778	VOLKSWAGEN 411, 412 68-74 covers all models	\$12.95
8748	VOLKSWAGEN DASHER 74-79 covers all models	\$12.95
1754	VOLVO 142, 144, 145 66-74 for all models inc 5 & 6	\$12.95
9558	VOLVO 164 68-75 for all models inc fuel injection	\$12.95
3729	VOLVO 242, 244, 245 75-82 covers all models	\$12.95
8311	VOLVO 264, 265 75-80 covers all models	\$12.95



# RONSON CORPORATION INTRODUCES...



## THE QUICKER UNSTICKER, THE BETTER PROTECTOR

Endless uses for the home,  
auto, workshop, farm, boat  
and sports equipment.

- Frees sliding bolts.
- Turns keys in locks.
- Loosens rusted screws.
- Stops squeaks.
- Keeps sliding doors sliding.
- Silences squeaky hinges.
- Cleans and lubricates toys, bicycles & fishing reels.
- Dissolves crayon & tar marks.
- Loosens zippers.
- Keeps fans working smoothly.
- Keeps garage doors rolling.
- Gets the rust off tools.
- Keeps clippers clipping.
- Keeps mowers mowing.
- Keeps spreaders spreading.
- Keeps sprinklers turning.
- Dries moist ignitions.
- Lubricates linkages, pedals & door handles.
- Cleans and protects guns.
- Keeps ski bindings working.
- Unsticks lug nuts.
- Protects metal against

## ENERGY SIEVE

(Continued from page 50)



At left is a vented LP-gas (propane) heater that works quietly and cleanly to provide heat in a corner bedroom of the west wing. The exterior setup at right shows the exhaust vent and the propane tank, which are positioned a specified distance from each other. The gas line goes through the house wall and is buried to avoid damage.



auditor that we didn't make. Due to budget limitations, this homeowner decided to concentrate first on tightening the shell of his home.

The construction consultant suggested sloping the earth away from the house on all sides. This would keep out water and moisture to help the heating equipment function properly. He also suggested adding foundation insulation to the north and east sides, and caulking, from inside the house, the joint between the top of the basement wall and the wood floor framing.

To better control heat, the consultant suggested zoning the home into three areas: the central living area including the kitchen, living, dining and family rooms; an east bedroom wing; and a west bedroom wing. These three zones were separated easily by adding doors at both ends of the long central hall.

We added a fireplace insert in the

central zone for its greatly increased wood-burning efficiency. A vented propane gas heater was installed in a bedroom of the west wing. The use of spot heating from portable heaters was another energy saver.

Now that the house shell has been made more energy conservative, ventilation must be introduced. In many homes, this can be done automatically with fresh air transported by a duct system. But this homeowner opens windows and doors for short periods on a regular basis each day.

At some point, the present water heater, located in the center of the house, will be replaced with two water heaters installed in the attic. One will be placed over each bedroom wing. The water heater nearest to the kitchen will service it. This will eliminate the inefficiency of heated water traveling long

(Please turn to page 190)

## ENERGY CONSERVATION STEPS

Measures	Approximate D-I-Y Cost (\$)	First-Year Savings (\$)	Time To Payback
Caulking	50	262	2 mo.
Weatherstripping	20	35	7 mo.
Interior storm windows (north and east)	230	53	4½ yrs.
Steel entry door	196	30	6½ yrs.
Attic insulation (R-30)	600	149	4 yrs.
Wall insulation (interior north wall)	100	30	3½ yrs.
Basement ceiling insulation (200 sq. ft.)	60	40	1½ yrs.
Foundation insulation	400	100	4 yrs.
Water heater insulation	15	30	6 mo.

### Inexpensive Practices

Insulators on all outlets and switchplates located on exterior walls.  
Attic stairs cover for attic opening.

### Energy-Related Improvements

Storm doors (two) on front and back of house to reduce wind gusts entering the home.  
Three pairs of solid, louvered-look interior doors to zone the heating areas.  
LP vented (propane) heater in heat zone 1.  
Fireplace insert in heat zone 3.



# GE RECHARGEABLE BATTERIES LAST UP TO FOUR YEARS. BUT THIS DEAL WON'T.

Now, for a limited time, GE gives you a *free* charger in every specially marked Rechargeable Battery Set at participating retailers. And that's just the beginning of big savings. Because GE will also send you a \$2 rebate for any Rechargeable Battery Set you buy. Just clip the coupon from this ad and send it to GE with your proof of purchase. It's that easy.



GE Rechargeables are rechargeable over and over again. But we only charge you once. You don't throw them away like old-fashioned disposable batteries — you plug them in and *recharge* them. GE Rechargeables keep on charging and powering for up to *four years*.

So hurry and get your free charger now and \$2 back. It's never been easier to start saving with GE Rechargeable batteries. Call us toll-free for the dealer nearest you.



Your Direct Line to General Electric  
The GE Answer Center 800.626.2000



## \$2.00 REBATE

For buying GE Rechargeable Battery Sets. Just fill in this coupon and mail it with purchase confirmation from the side of a GE Rechargeable Battery Set package and register receipt.

Please print

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_

Send to: Two Bucks Back '83, General Electric Charger Rebate  
1 Industrial Drive, P.O. Box 6669, Maple Plain, MN 55393

Limit of one rebate per family or address. Offer good only in USA. Void where prohibited, taxed or restricted. Offer expires January 31, 1984. Original coupon and register receipt must accompany request. Copies will not be accepted.

5

WE BRING GOOD THINGS TO LIFE.

GENERAL  ELECTRIC





# WITH DODGE, RUST PROTECTION ISN'T AN ADD-ON. IT'S A BUILT-IN.

## WE ARE DODGE. AND WE KNOW HOW TO BACK A TRUCK.

It's not just the years and the miles that wear on a truck. It's the mud and the salt and the sun.

But Dodge fights back. With relentless dedication. We don't think of rust protection as optional equipment. And neither should you.

## WITH MORE GALVANIZED STEEL PROTECTION.

For 1984, there's even more rust-fighting galvanized steel surface in a full-sized Dodge pickup than ever. 332 sq. ft. in all. 14% more than Chevy. And a full 53% more than Ford.

But as far as we're concerned, even that isn't protection enough.

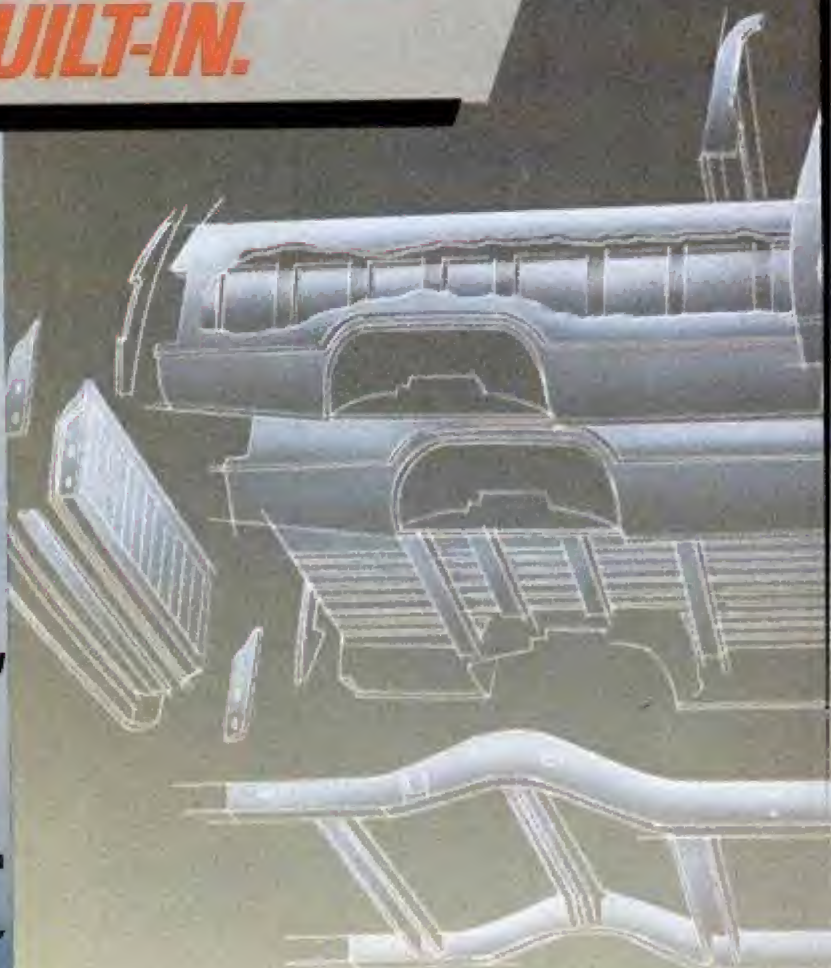
So, we also wash our trucks in phosphate and rinse them in acid for additional corrosion resistance.

We're tough on rust. One reason why 92% of all Dodge trucks built in the last ten years are still on the road.\*

## AND AMERICA'S LONGEST, NO-EXTRA- COST FACTORY RUST-THRU PROTECTION TRUCK WARRANTY.\*

When you're this tough on rust, you can back your truck with this tough an outer body rust-through warranty:

Five years or 100,000 miles, whichever comes first.



Extensive use of galvanized steel in critical areas makes Dodge tough on rust.

There's 332 sq. ft. of galvanized steel surface in short-wheelbase Dodge pickups. And 362 sq. ft. in long-wheelbase trucks.



DODGE RAM D100

EPA  
EST  
MPG 18 EST  
HWY 26

Use EPA est. mpg to compare. Your mileage may vary with speed, distance, weather. Actual hwy. mpg & CA ests. less. \*R. L. Polk & Co. registrations through 7/1/82.

BUCKLE UP FOR SAFETY.



A six-stage phosphate and acid treatment cleans and conditions the Valbody for enhanced paint adhesion and corrosion resistance.

Three-coat epoxy primer/acrylic enamel painting process results in a high-gloss finish that's highly resistant to chipping, fading and corrosion.



Front suspension crossmembers are protected by an autophoretic cleansing/coating process for increased corrosion resistance.

**DODGE D150.  
BIG TRUCK. BIG PAYLOAD.  
BIG 360 V-8 OPTION.**

When the job demands muscle, tough it up in a Ram Tough Dodge D150.

It'll haul up to 2,365 pounds, maximum optional payload. And speed you on your way with a dependable, efficient Dodge Slant Six. Optional sturdy 318 V-8. Or an even bigger and beefier optional 360.

**SAVE HUNDREDS  
WITH PROSPECTOR  
OPTION DISCOUNTS.**

Save on options such as air conditioning, tinted glass, long range fuel tanks and two-tone paint treatments. Actual savings depend on model

and package. And are based on the list prices of package items if purchased separately. So see your dealer for full details.

**NEW 5/100**

**5-YEAR/100,000 MILE RUST-THRU PROTECTION WARRANTY**

5-year/100,000 mile (whichever comes first) limited warranty on outer body rust-through. 1984 full size pickups and Ramchargers. Ask dealer for details.

**NO EXTRA COST**

\*Based on a comparison of manufacturers' warranties at time of publication.



DODGE RAM D150



# Four Tool Kits That Work



## Tool roll and pouch

This 20-pocket canvas tool roll in a vinyl-lined zippered pouch is designed for storing wood chisels and other carving tools. One end of the tool roll is sewn into the pouch so the tools fold away safely. This prevents the cutting edges from becoming nicked or rusty. Excluding the tools shown, the roll and pouch sell for \$34.95 postpaid from Garrett Wade Co., 161 Avenue of the Americas, New York, N.Y. 10013.



## Leather bag

This top-grain leather tool bag holds a small assortment of tools, such as those often kept in a car trunk or boat locker. The bag measures 5 x 6 x 15 in. and features two all-leather handles and a shoe-sole leather bottom with four nickel-plated feet. Two interior pockets can hold odds and ends. It's \$36.70 postpaid from Brookstone Co., 695 Vose Farm Rd., Peterborough, N.H. 03458.



## Roll-out tool kit

The Rolykit is a 14-compartment, polystyrene storage case made for holding hand tools, hardware and other small parts. Two permanently attached canvas straps and the clever interlocking case construction allow the kit to be rolled up to a compact 6 1/4 x 11 in. without the contents of one compartment spilling into another. It's from Specialty Items Distributing Inc., 1820 Jasper, North Kansas City, Mo. 64116, and is \$32.45 postpaid. An 11-compartment kit is \$27.45 postpaid.



## Combination tool case and overnight bag

The Overnighter is a dual-purpose carrying case that has two separate locking compartments: one for tools, one for clothes. The case measures 12 3/4 x 17 3/4 in. and features a vinyl-covered hardwood frame and solid brass hinges and locks. The tool side is 4 1/4 in. deep and the clothing side is 2 3/4 in. deep. Without the tools shown, the case sells for \$109 postpaid from Jensen Tools Inc., 7815 South 46th St., Phoenix, Ariz. 85040. With the tools, it's \$383 postpaid.

PM





Pat Summerall, Award-Winning Sportscaster

"The folks at your True Value Hardware Store or Home Center can help you cut the costs of home care with outstanding values on energy-savers, workshop tools, hardware and fixtures. They offer expert advice, the finest brand name products and low prices to make every do-it-yourself project a success."

# FIX-UP VALUES



**MASTER MECHANIC® Electric Staple Gun** has the power to drive staples deep into hardwood. Features open channel loading for easy jam clearing. Built-in staple remover. Solid-state circuitry. Safety lock. M5100 **19.99**



**MASTER PLUMBER™ Kitchen Faucet** is washerless so it's maintenance-free. Easy to install on sink's center mount. Single lever rotates. 452615 . . . . . **29.95**  
With sprayer. 452631 . . . **38.95**

**TRU-TEST® X-O Rust®** seals out air and moisture to stop old rust from spreading, new rust from forming. Wide choice of colors to restore metal. QT . . . . . **4.98**  
16 fl. oz. spray can . . . **2.78**



**MASTER ELECTRICIAN™ 3-Way Wall Dimmer** rotates to dim or brighten light. Pushes on/off to preset brightness. 414896 **5.49**

**MASTER ELECTRICIAN™ Phone Accessories.** Modular wall jack. 371328 . . . **1.89**  
Mod. Quik-Jack. 469759 . **1.89**  
25' hand cord. 469700 . **4.79**  
Convert-A-Plug. 371294 . **1.89**

**KWIKSET® Special Lock Offer.** Buy a stylish Grecian Entry Lockset and get a free bedroom lockset. Both are reliable and easy to install. 892CP **13.88**

**W.R. GRACE® Polycel One® Foam Sealant** stops drafts. Fills cracks to insulate against air and moisture. 12-oz. can. PC5SHRW **3.66**

**MACCO® Liquid Nails®** rubber-based, waterproof adhesive bridges uneven surfaces. 6 caulking gun sized stix. LN-601S . . . . **6.49**  
Quart. LN-603Q . . . . . **2.59**

For the True Value Hardware Store or Home Center nearest you—look under "Hardware" in the Yellow Pages.

**Tear out and save this 8-page section.**







**TRUE VALUE® Quartz Electric Fan-Forced Heater** has 2 reflectors for wide-angle heating, 1500/750W settings, auto. thermostat. HR80Q **44<sup>88</sup>**



**INTERTHERM® Portable Baseboard Heater** safely circulates hot water heat. 750W unit warms at 2550 BTU/hr. Thermostat. NP750 **79<sup>99</sup>**

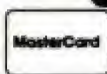
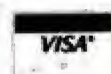


**AMCA® Reddy Heater®** operates up to 13 hrs. on one tank of kerosene. 30,000 BTU, flameoff safety sensor. R30 . . . . . **149.95**  
50,000 BTU heater. R50 . . **179.95**



**HUNTER® 52" Ceiling Fan** stirs a breeze to cut heating/cooling costs. Quiet, rugged motor with real wood reverse-air blades. 22272/580 **159<sup>99</sup>**

# A Warm Welcome to



Cut costs and save energy around your house and "charge it" at participating True Value Hardware Stores and

**118<sup>88</sup>**  
9,600 BTU



**118<sup>88</sup>**  
15,200 BTU



**38<sup>88</sup>**



**16<sup>99</sup>**

**2<sup>79</sup>**



**99<sup>95</sup>**



**158<sup>88</sup>**



**ALADDIN® 9,600 BTU Kerosene Heater** heats for 17-22 hours on 1.2-gal. fuel. Automatic ignition/extinguish. Almond finish. C381U **118<sup>88</sup>**

**ALADDIN® 15,200 BTU Kerosene Heater** with automatic ignition/extinguish, heats 12-16 hours on 1.3-gal. fuel. Almond finish. C581U **118<sup>88</sup>**

**ALADDIN® Heater Fan**, 2 speeds, increases warm air circulation, mounts on most radiant heaters. Brown epoxy finish. HF183 **38<sup>88</sup>**

**MET PRO® Breathe Easy™ Filter** for radiant and convection kerosene heaters cleans and purifies air while reducing emissions. Installs in minutes. CF2001 **16<sup>99</sup>**

**CFP® Kero-Aid® Kerosene Treatment** totally disperses water, reduces odor and carboning of wick for more complete, cleaner burn. 8 oz. treats 80 gallons. 7181-1 **2<sup>79</sup>**

**GLO 70™ Radiant Kerosene Heater** has 8,400 BTU/hr. output to warm up to 300 sq. ft. comfortably. Auto shutoff. Lift-out fuel tank. 70GLO . . . . . **99.95**  
10,100-12,600 BTU heater. SX3. **179.95**

**GLO® XL-DK Portable Kerosene Heater** has 22,600 BTU/hr. capacity to heat up to 800 sq. ft. Automatic shutoff. 1.82 gal. tank heats up to 11 hrs. XLDK **158<sup>88</sup>**



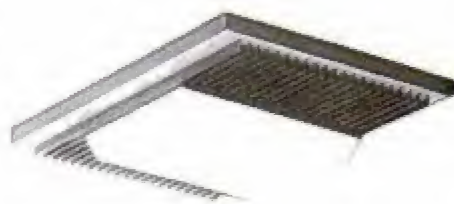
**Pump-ette® Siphon Pump** with suspension ring, sealed switch, drain tube with impeller, flexible outlet hose. Battery-operated. FP-120 **8<sup>88</sup>**



**DEFLECT-O® Air Deflector** improves circulation from central forced air heating. Attaches with magnets. Adjusts 10-14". 2-pack. 1022 **1<sup>59</sup>**



**POLO® Electric Oil-Filled Radiator** with air sensitive thermostat is safe for small children. 600/900/1500W, portable. 7815 **59<sup>99</sup>**



**NAUTILUS® Heater/Fan/Light Unit** for the bath has 2-motor system, 1430W fan-forced heater. Fits 4" rd. duct. Unbreakable grille. N655 **69<sup>95</sup>**

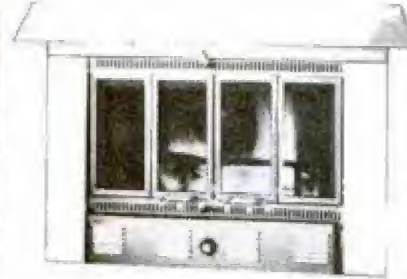




**EMERSON® Ceiling Fan** has 4-speed reversible motor, pull-chain control. Real wood blades. Brn. or Antique White with brass. CF4152/W **149<sup>95</sup>**



**FIRST ALERT® Safety Kit** includes smoke detector and 5 B.C. dry chemical extinguisher to fight grease, oil and electrical fires. SA67EXT **19<sup>99</sup>**



**BENNETT-IRELAND® Fireplace Insert** turns your fireplace into an energy-saver. Antique brass finish, glass doors. Dual fans. 1106 **399<sup>95</sup>**



**G.E.® Smoke Alarm** uses 9V battery, blasts 85-decibel horn warning as smoke rises. Has low battery alert and tester. SMK6 **12<sup>99</sup>**

# Energy Savers

Home Centers.

Special prices expire Oct. 29th.

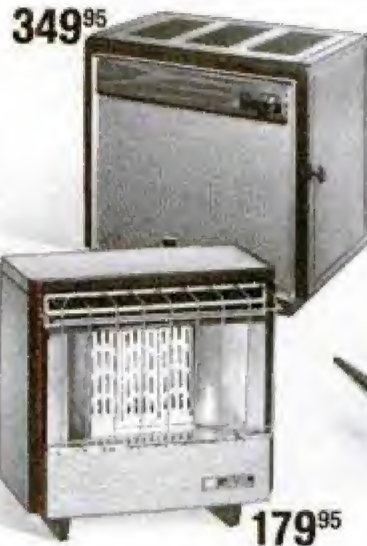


**99<sup>95</sup>**

**149<sup>99</sup>**

**WESTBEND® 2-Speed Humidifier** with refill light, water gauge. Lift-out power pak and removable water reservoir. Automatic shutoff. 2,500-sq. ft. capacity. 4022 **99<sup>95</sup>**

**WESTBEND® Humidifier** with water-wheel moisturizing action, 2-speed fan, auto. humidistat. 2,500-sq. ft. capacity. Directional airflow, 9½-gal. reservoir. 3027 **149<sup>99</sup>**



**349<sup>95</sup>**

**179<sup>95</sup>**

**MARTIN® Wood-Burning Heat Circulator** has automatic thermostat, cast iron grates, rotating shaker, flue collar. Louvered top and stay-cool handles. 8802B **349<sup>95</sup>**

**MARTIN® Gas Heater** with oxygen depletion sensing system provides clean, safe, efficient zone heating. Warms at 20,000 BTU/hr. Safety pilot. C1720 **179<sup>95</sup>**



**14<sup>99</sup>**

**PORTLAND® Fireplace Accessories.**

- ☐ Glass Firescreen has ¼" thick tempered glass that pops out to clean. Forced air effect makes door track self-cleaning. Fits openings 36-40" wide, 21-25" high. Choice of heat-resistant finishes. 1400-4225-01 **149.95**
- ☐ Polished brass finish wood holder. 0448 **44.99**
- ☐ Brass tools: shovel, brush, poker, stand. 0640 **34.95**

**VESTAL® 24" Cast Iron Grate** for fireplaces, fireplace inserts, wood or coal stoves. 324LB. **14.99**  
24" Steel grate. S824 **9.99** (Other sizes available.)



**ENERGAIRE® Duct Booster** forces more air into hard to heat or cool areas to lower utility bills. Fits 5" round, 3¼" flat ducts. EA-5 **22<sup>99</sup>**



**EMBERGLO® Gas Space Heater** needs no flue installation. Oxygen depletion shutoff. 3 heat settings. 1575LP **169.95**  
Space heater. 1575NA **169.95**



**MAGIC HEAT™ Waste Heat Circulator** installs in flue of any heating unit. Thermostatically controlled, built-in fan. 6" or 8" size. MH6R/8 **84<sup>99</sup>**



**MASTER PLUMBER™ 12-Ft. Pipe Insulation** for ½" copper & ¾" steel pipes **3.99**  
¾" copper & ½" steel **4.49**  
1" copper & ¾" steel **4.99**





**MASTER MECHANIC® 5-Gal. Wet/Dry Vac** with 1.1-HP motor for heavy-duty cleaning. Includes 6' hose and 1 1/4" car tool. MM600-5 **39<sup>99</sup>**



**MASTER MECHANIC® Glue Gun** bonds permanently in 60 seconds...caulks and seals, too. Has thermostat and trigger control. 207MM **13<sup>99</sup>**



**MASTER MECHANIC® 6-Pocket Tool Pouch** has 2 plier pockets, 2 screwdriver slots, tape pocket. Fits belts up to 2" wide. MM3438 **6<sup>99</sup>**



**MASTER MECHANIC® Tape Holder** with molded pocket for one-handed tape removal. For steel tape up to 25' long. Leather. MMLH463X **2<sup>99</sup>**



# "The Works"

Save on all your workshop needs at more than 6,000 True Value Hardware Stores



**MASTER MECHANIC® 3-Pc. Cold Chisel Set** has 3/4", 1/2" and 3/8" chisels forged from heat-treated high-carbon steel. Head design reduces spalling. MM10 **8<sup>29</sup>**

**MASTER MECHANIC® Chisel Set** shapes wood and composition. 1/2", 3/4" and 1" hardened steel blades are bevel ground to maintain their sharpness. 300MM **8<sup>79</sup>**



**99<sup>c</sup> Ea.**

**MASTER MECHANIC® Utility Knives** with die-cast bodies. Choose heavy-duty non-retractable knife or midget retractable knife. Extra blades included. K11B Ea. **99<sup>c</sup>**

**MASTER MECHANIC® 7" Block Plane** has precision-ground cutters, cast-iron body, polished bottom and sides. Adjusts for thickness of cut. 1 1/4" cutter. G2MM **8<sup>49</sup>**



**2<sup>69</sup>**

**MASTER MECHANIC® Contour Gauge** has 175 steel teeth to hold and match uneven surfaces of tile, linoleum perfectly. 6" long. MM4521 **2<sup>69</sup>**

**MASTER MECHANIC® 7" Home & Garden File** is double cut on both sides for fast honing of mower blades, tools. Built-in handle. MM04116 **2<sup>79</sup>**

**MASTER MECHANIC® 25' Tape** has easy-reading 1" wide blade, power lock-return switch, removable belt clip. End hook self-adjusts. MMP425 **9<sup>49</sup>**



**SKIL® 7 1/4" Circular Saw** has 2 1/4-HP motor, ball-bearing construction, dependable helical gears. Carbide-tipped blade. 55935 **69<sup>99</sup>**



**SKIL® Sandcat™ Sander** has the control of an orbital sander, the low vibration of a belt sander. Locking lever. 5 belts. 593 **45<sup>99</sup>**



**DURACRAFT® 10" Table Saw** rips and crosscuts to 3 1/16" deep, miters ± 60°. Hi-torque motor, carbide-tipped blade. UL listed. BTS10UL **114<sup>99</sup>**



**SERVESS® 16-oz. Nail Hammer** has highly polished, heat-treated steel head. Flame hardened shock absorbing wood handle. 3-16HFN **3<sup>99</sup>**





**MASTER MECHANIC® Single Bit Axe** is drop-forged from high-quality tool steel & hand-ground to keep its keen edge. Hickory handle. 35S8TT **9<sup>99</sup>**

**MASTER MECHANIC® 6-lb. Splitting Maul** has a drop-forged, hand-ground steel head fitted to a fire-hardened hickory handle. MMS6MA **11<sup>99</sup>**

**MASTER MECHANIC® Claw Bar**, forged from hi-carbon steel with cat's paw, ripping bar, 3 nail pullers, cutting blade. MM132 **5<sup>29</sup>**



**MASTER MECHANIC® Staple Gun** shoots a staple where you'd drive a nail. Jam-proof mechanism, visual refill window. Steel/chrome. M5000 **13<sup>95</sup>**

# for Your Shop

and Home Centers. Look under "Hardware" in the Yellow Pages.



**George Bignotti**, master mechanic to a record number of 7 Indy 500 winners: "Professional-quality tools are essential to quality workmanship. That's why I rely on Master Mechanic® tools and accessories sold exclusively at True Value Hardware Stores and Home Centers."



**MASTER MECHANIC® Hack Saw Frame** adjusts to fit blades from 8 to 12" long, cuts at 4 different angles. 3 3/4" deep. Blade incl. 125MM **4<sup>99</sup>**

**MASTER MECHANIC® 26" 8-Pt. Handsaw** is hard-working. With highly polished precision ground blade secured to a hardwood handle. MM40080 **6<sup>29</sup>**

**MASTER MECHANIC® 2-in-1 Shaping Tool** uses interchangeable blades to plane, shape, shave, file and sand wood, plastic and soft metal. 80570 **6<sup>99</sup>**



**MASTER MECHANIC® Sabre Saw Blades**, 7-piece set includes high-quality, precision-ground blades for wood and metal cutting. 1/4" shank. 151506 **2<sup>29</sup>**

**MASTER MECHANIC® Retractable Knife** is designed to control depth of cut. Blade locks in 9 different positions. All aluminum handle contains 2 blades. K15CMM **1<sup>89</sup>**



**MASTER MECHANIC® Tool Box** of heavy-gauge, all-steel construction with roomy 16" hip-roof design. Tote tray, padlock eye. Shop or hobby use. MM615 **7<sup>95</sup>**

**MASTER MECHANIC® 35-Pc. Socket Set** has 1/4" and 3/8" drive sockets, 12 SAE and 16 metric, plus extension, ratchet, adapter, spinner and more. MM735 **22<sup>99</sup>**



**SERVESS® 6" Slip-Joint Pliers** with smooth jaw action. Drop-forged steel, nickel-plated against rust. Pick up a spare at savings. 247S **1<sup>19</sup>**

**MASTER MECHANIC® Sawhorse Brackets** convert 5 pieces of lumber into a sawhorse without nails, bolts, miter cuts. Wingnut locks. 100 **4<sup>99</sup>**



**NATIONAL® 1/4" and 3/8"- Drive Sockets**, 41-pc. set includes 33 sockets, SAE and metric, plus ratchet, extensions, more. Case. C8441AFM **12<sup>99</sup>**



**GEDORE® 11-Pc. Wrench Set** has 3/8" to 1" SAE sizes. Drop-forged chrome vanadium steel, hardened and tempered. Pouch/ 171/111A **18<sup>99</sup>**





**MASTER ELECTRICIAN™ 3' Power Center.** 238485 . . . **2.79**  
 60' extension cord. 239319 . . . **6.49**  
 25' extension cord. 239301 . . . **3.49**  
 100' extension cord. 239327 . **9.99**



**MASTER ELECTRICIAN™ Crimp 'n Cut Kit** has wire cutter, 48 most commonly used terminals, hang-up box. 479279 **5.99**  
 50' Port-A-Phone cord. 48778 **9.99**



**WOOD'S WIRE® Retractable Reel Light** has 20' SVT cord, grounded guard, outlet. Ideal for garage, basement, attic workshops. 212 **14.88**



**EDISON LIGHTING® Lanterns.** 60W with matte black finish. Choose from wall, semi-ceiling or post mounts. E3226/3626/3726-9 Each **16.88**

**True Value**  
 HARDWARE STORES®

Special prices  
 expire Oct. 29th.

**"Do-It-Your"**



**16.95**



**20.95**



**27.95**

**MASTER PLUMBER™ Kitchen Faucet** of chrome-plated brass has 2 handles, installs easily. 261-20MP . **16.95**  
 Kitchen faucet with aerator 261-40MP . . . **22.95**

**MASTER PLUMBER™ Washerless Faucet** for the bath, single lever. Chrome-plated brass. 452649 . . . **27.95**  
 Washerless faucet with drain. 452656 . . . **32.95**

**POLLENEX® Water Purifier 99™** has 4-stage filter to remove most chemicals and minerals that ruin water odor or taste. WP100 **20.95**



**FULFLO® Water Purifier** has carbon filter to remove odors, sand, rust, algae. Installs under sink, with installation kit. WT-6 **36.95**



**G.E.® Silicone II® Sealants** for all around the house: bathtub, concrete, windows, doors. Paintable & clear. 10.3-oz. cartridges. GE5000/L/2/7/90 **3.99**



**17.95**

**34.95**

**ZENITH® Mirrored Surface-Mount Cabinet** has steel welded construction, white enamel finish, 3 safety-edge shelves. Installs easily. 14x22x4½" overall size. 9 **17.95**

**ALSON'S® Personal Shower** replaces regular shower head with push-button convenience. Hang or hold. 59" hose. 410PB-PK . . . **19.95**  
 Massage Action head. 45C-PK . . . **34.95**



**MASTER PLUMBER™ Teflon Tape.** ½ x 300" 017090 . . . **69¢**  
 Toilet Tank Flush Lever fits most standard tanks. 091110 . . . **1.59**  
 Tub & Shower Caulk. 6-oz. . **1.49**



**19.95**

**14.95**

**FRANKLIN BRASS® Soap Dish** of brass on oak. D5006PB . . . **7.99**  
 Matching towel ring. D5016PB . **14.95**  
 Matching 18" twl. bar. D5018PB . **15.95**  
 Dbl. robe hook. (not shown) D5002PB . **7.49**

**MAYFAIR® Embroidered Soft Seat** adds beauty and comfort to the bath. Installs without tools. Easy-clean vinyl in choice of colors, designs. 13-15/16D Ea. **14.95**

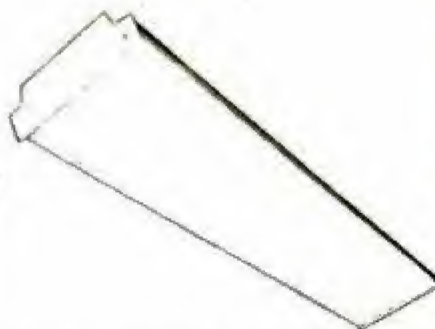


**FLOTEC® Drill-Powered Pump** attaches to electric drill to remove water, drain oil. Port couplings for easy hose connection. DMP21SA **3.49**





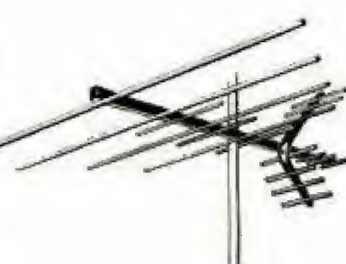
**ITT LIGHTING® 70-Watt High Pressure Sodium Light** automatically turns on at dusk...off at dawn. Decorative bronze finish. DR70H **78<sup>88</sup>**



**AMERICAN FLUORESCENT® Fixture** has clear prismatic cover to diffuse light, cut glare. 48" long. Uses two 40W fluor. bulbs (not incl.) NW240 **21<sup>99</sup>**



**GE® Miser™ Bulbs** give more light than the watts they use. 55, 70 or 95W incandescent. 55/70/95AW/M ..... 4 for **1.99**  
40W fluorescent tube .... **1.89**



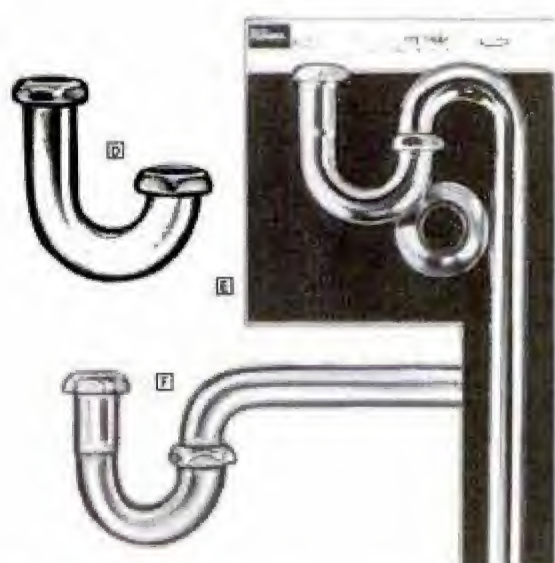
**DUR-O-PEG® TV Antenna** features 19-element VHF/UHF/FM tuning for clear, sharp viewing on black & white, color sets. 8072 **19<sup>99</sup>**

# self Savings

Get the newest fix-up products and "charge it" at participating True Value Hardware Stores and Home Centers.

VISA®

MasterCard



Ⓜ **MASTER PLUMBER™ J-Bend** for sink repair, remodeling or new installations. Chrome-plated. Easy to install. 1 1/4" TV1PC ..... **3.49** 1 1/2" TV2SN ..... **3.99**

Ⓜ **MASTER PLUMBER™ S-Trap** comes ready to install for repairs, remodeling or new installations. 1 1/4" TV200PC ..... **7.99** 1 1/2" TV250SN ..... **9.49**

Ⓜ **MASTER PLUMBER™ P-Trap** is chrome-plated, installs with a simple wrench. Connections hand-tighten. 1 1/4" TV100PC ..... **4.99** 1 1/2" TV150SN ..... **5.99**



**MASTER PLUMBER™** simplifies do-it-yourself plumbing repairs.

Ⓜ **Swivel Spray Aerator.** 223057 ..... **2.19**

Ⓜ **Samson® Plunger.** 7505 ..... **3.99**

Ⓜ **Basin Wrench.** 223370 ..... **5.99**

Ⓜ **G.T. WATER PRODUCTS® Drain Opener** unclogs kitchen, bath and laundry room drains with ease. Fits standard drains 1 1/2 to 3". Safe, reusable. 186 **4<sup>99</sup>**



**COUGHLAN™ CREOSOTE Re-mover** controls creosote buildup. Helps prevent heat loss and chimney fires. Non-flammable and anti-corrosive. 16-oz. can. CR-1 **3<sup>49</sup>**

**COUGHLAN™ Chimney Sweep®** powder removes soot by vaporizing it. Helps prevent chimney fires. Improves draft. For coal and wood burners. 16-oz. can. C16 **1<sup>49</sup>**

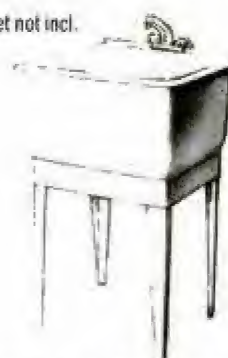


**MASTER PLUMBER™ Values.**  
1/2 x 3/8" strght. valve. 220608 . **3.69**  
1/2 x 3/8" angle valve. 220582 . **3.29**  
12 x 3/8" toilet supply. 220442. **1.69**  
12 x 3/8" corrugated. 219634. **3.99**



**THOMPSON'S® Water Seal** waterproofs wood, masonry, fabric, any porous surface. 101-0A/4/1 12-oz. spray. . . **2.99**  
Qt. .... **3.88** Gal. .... **8.88**

Faucet not incl.



**ASTER® Laundry Tub** of lightweight polypropylene is rust-resistant. Features 2 soap rests and convenient splash guard. 725F **20<sup>95</sup>**



**SIMER® Geyser Pump** for indoor and outdoor use. All metal construction is submersible. Anti-airlock valve. Portable. 115V. 2300 **49<sup>95</sup>**





**WAGNER® Heavy-Duty 10-pc. Power Painter** is the airless electric sprayer for paints, stains, varnishes. 3058/200 . . . . . **99.99**  
14-pc. outfit 3070/300 . . . . . **129.99**



**TUCK® Duct Tape** is a must for do-it-yourselfers. Now's the time to stock up on this energy saving cloth tape. 2" x 10 yds. C1245A **99c**



**Emco® Water-Way™ Hinged Rain Diverter** may prevent basement seepage and eliminate foundation repairs. 36" long vinyl. WW3624 **3.49**

# 12

**GERBER® 7" Polystyrene Numbers** have pre-primed, richly grained finish to paint or stain. Use indoors or out. Ready to mount. Ea. **1.19**



## Fix-Up Values



**3M® Window Insulator Kit** stops cold drafts. Clear plastic shrinks to fit in minutes with hair dryer heat. 42 x 62". 2140 . . . . . **2.66**  
62 x 210" window kit. 2141 . . . . . **8.99**

**3M® V-Seal Weather Strip** blocks drafts around doors and windows. Installs with scissors. 17', brown or white. 2100/1 . . . . . **3.44**  
90', brown or white. 2102/3 . . . . . **14.44**



**W.J. DENNIS® 36" Door Bottom** of durable extruded aluminum protects while it weathers. Soft, flexible vinyl lip sweep. A-54P . . . . . **1.49**  
17' vinyl/aluminum roll. 217V . . . . . **2.99**

**FROST KING® Window Air Conditioner Cover** fits snugly. AC-2 . . . . . **3.69**  
Foam switch and outlet cover stops annoying drafts and heat loss. Invisible when installed. OS12 . . . . . **99c**



**M-D® Jamb-Up Door Weatherstrip** nails in place in a jiffy. Fits doors 36 x 84". Without bottom . . . . . **4.44**  
36" Seal-O-Matic™ door bottom keeps cold air out, heat inside. . . . . **8.88**

**MORTELL® Winter Shield™** for thru-wall air conditioners. Polystyrene cover beautifies while it blocks drafts. Reusable, installs easily. WS-1 . . . . . **9.88**  
45' weatherstrip roll. F-4 . . . . . **1.77**

**TRI-FLOW® Lubricant** with Teflon® penetrates to free frozen mechanisms, reduce friction and wear, prevent rust. 3-oz. spray. 13000 **1.99**



**GENIE® Garage Door Opener** with Trac Drive™ has 1/3-HP motor. Automatic light delay permits safe entry to home. GS810TT **178.88**



**K-V® Shelving.** Pecan-look shelf. 1981SWP 8x24" . . . . . **3.33**  
10x24" . . . . . **3.83** Brass shelf bracket. 180BR 8" . . . . . **1.44** 10" . . . . . **1.54**  
3' shelf standard. 80BR . . . . . **2.74**



**GENOVA® Raingo™ Gutter System.** No welding. PVC vinyl snaps together fast & easily. 10' gutter. RW100 . . . . . **4.89**  
10' downspout. RW200 . . . . . **5.99**



**MASTER LOCK® Bike Lock** with 1/2-inch thick hardened steel shackle is 8 1/2" long and virtually indestructible. 52-D **17.99**

There are more than 6,000 True Value Hardware Stores and Home Centers in 50 states. Look under "Hardware" in the Yellow Pages.

**COTTER & COMPANY.** General Office, Chicago, IL 60614. 100% Member-Owned warehouse distributor serving over 6,000 True Value Members who own their own stores, set their prices and reserve the right to limit quantities. Because participating True Value Hardware Stores vary in size and merchandising policies, some may not stock all items shown. Prices may vary and are subject to change without notice. Prices expire Oct. 29, 1983.

8-page tear-out section.



# PAINT STRIPPERS:

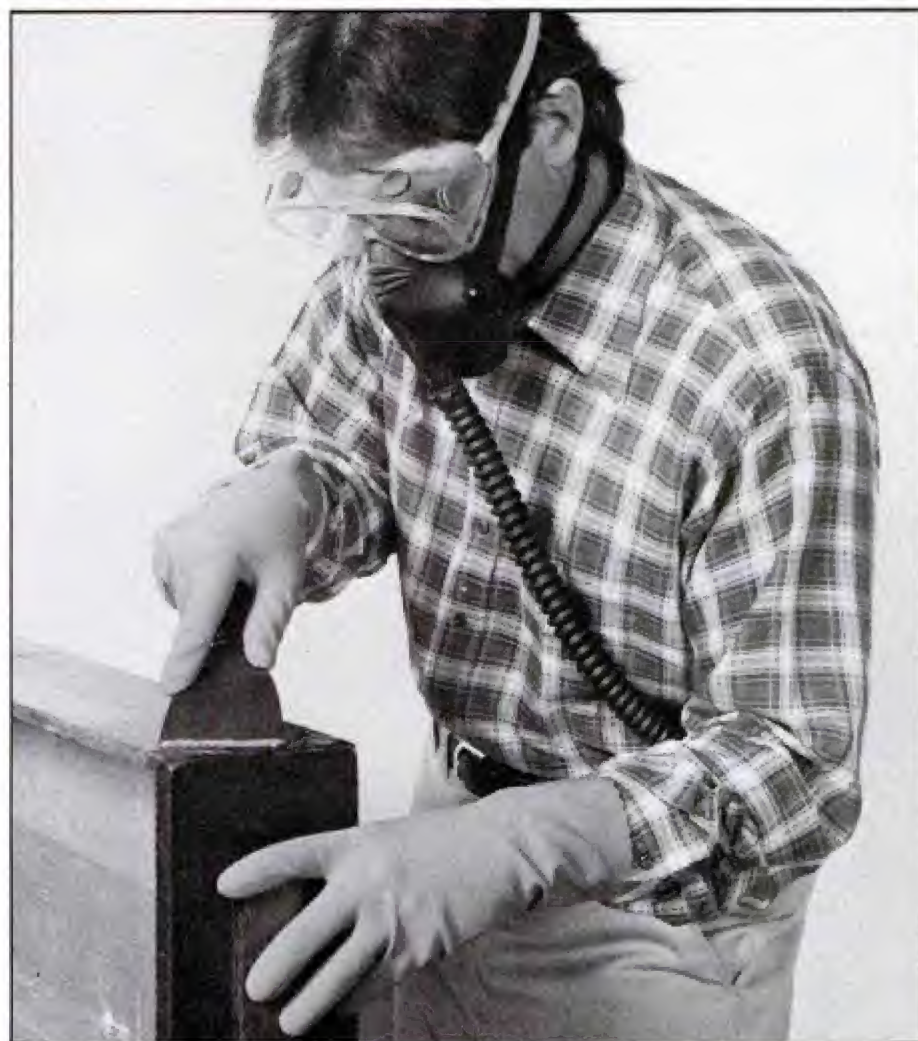
## Beware The Hidden Hazard

**W**ith a growing number of do-it-yourselfers refinishing old furniture, paint stripping—the removal of old paint and varnish—has become common practice.

The most popular method of stripping an old finish is with chemical paint removers. These are economical, easy to use and highly effective, even on several layers of finish. But, when chemical strippers are used improperly or carelessly, they can be extremely dangerous.

Most paint and varnish removers

contain methylene chloride (also known as dichloromethane) and methanol (methyl alcohol). According to the *Occupational Health Guidelines* of the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA), both chemicals are highly toxic when used in poorly ventilated areas.



Proper paint-stripping attire includes long-sleeve shirt, chemical-resistant gloves, splashproof goggles and an air-supplied respirator when using products that contain methanol. The respirator receives constant airflow from a compact pump (right). Operate the pump from outside of the contaminated work area.



BY JOSEPH TRUINI  
ASSISTANT HOME AND SHOP EDITOR

Short-term exposure to methylene chloride and methanol fumes causes light-headedness, nausea, mental confusion and irritation of the eyes and respiratory tract. Methylene chloride also has been known to contribute to heart attacks. The fumes metabolize to form carbon monoxide in the bloodstream and deprive the heart of sufficient oxygen. For this reason, heavy smokers and people having or suspected of having heart problems should be careful when using paint strippers.

For safe use, always apply refinishing products in well-ventilated areas—never in a basement or closed room. Do not use paint strippers near an open flame. This includes all pilot lights and hot surfaces such as gas stoves, kerosene heaters, water heaters and gas clothes dryers. Even nonflammable vapors may become toxic when exposed to high temperatures. For instance, methylene chloride vapors can convert to phosgene gas (a poisonous gas used during World War I) when used in the presence of an open flame.

The key to using chemical strippers safely is to work in well-ventilated areas and wear the right equipment.

Always wear a long-sleeve shirt and

(Please turn to page 186)

### SAFETY GUIDELINES

Here are several safety points to keep in mind when using paint strippers and solvents.

- Work in well-ventilated areas, never in a basement or closed room.
- Be sure to read all labels.
- Wear chemical-resistant gloves and splashproof goggles.
- Never apply strippers or solvents near an open flame or pilot light.
- Do not smoke while handling or applying chemical strippers.
- Use an exhaust fan motor with an explosion-proof rating.
- Store refinishing products out of the reach of children.
- Place stripper into metal or glass storage containers only.
- Do not store containers near heat or in direct sunlight.
- Keep a hose or bucket of water nearby for neutralizing chemical spills.
- Post local ambulance and poison control center telephone numbers nearby.
- People having or suspected of having heart trouble or any pulmonary disorder must consult their physician before using paint removers.

PM photos: Ray Solowinski  
Technical data: George Daniels  
Respirators and pump supplied by Eastco Industrial Safety Corp., Flushing, N.Y.



# A WOOD-HEATED PRIZE WINNER

This two-bedroom home has a number of attractions: It's economical to build, space-saving and energy-efficient.

BY PENELOPE A. SPANGLER ASSISTANT HOME AND SHOP EDITOR



An overhang shelters firewood and serves as a sunshade (above). Windows wrapping around southwest corner (above and below) provide a view from dining room.



**T**his elegant little house in central Vermont was a winner in a national design competition sponsored by Garden Way Publishing Co. The challenge was to design a compact home under 1,000 sq. ft.

Architect Thomas B. Leytham designed this one as an economical alternative to a mobile home. The house uses standard building materials and can be constructed in 30 days. In 1982, the house cost between \$35,000 and \$37,000 to build. Materials accounted for \$21,000 of the amount.

Leytham planned the house with

energy conservation in mind. The dining and living rooms share a south wall, which has banks of windows to take advantage of the view and to receive the sun's warmth. These windows continue on the west wall of the dining area to give it an open, airy feeling. In contrast, the utility room (which houses the electric hot-water heater, a washer and dryer), a half bath and the main-entry mud room are located along the north wall, which is windowless to keep out winter winds.

The house is heavily insulated in the walls, sloped ceiling, roof and at the

perimeter of its concrete slab. The slab is a floating one poured directly on the prepared ground. The foam insulation at the slab perimeter is 2 in. thick at an 18-in. depth, extending horizontally 4 ft. from each side. The horizontal extension of the insulation keeps frost from getting under the slab. Together with the ceramic tile covering the first floor, the slab serves as a passive heat-storage system, absorbing heat during the day and releasing it within the house at night.

A wood stove in the living area heats the entire house. The two cords of wood



needed to get through severe Vermont winters can be stacked right outside the door, under a protective overhang. Three 2-ft. sections of baseboard heating installed as a backup heat source (FHA requires conventional heating in homes it finances) have never been needed.

Besides being energy-efficient, the house is planned to make the most of its small space. The rooms on the first floor are laid out so they appear larger than they actually are. The openness of the space, where living room flows into dining room and dining room flows into kitchen, helps give this illusion. The expanses of windows with their views of rolling countryside also aid the effect. It comes as a surprise to note that the dining and living rooms together occupy a 12 x 21-ft. space—the size of some living rooms alone.

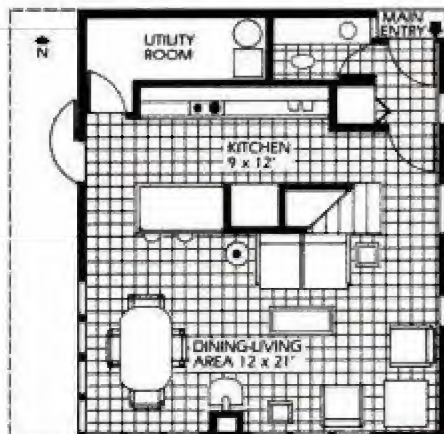
White walls lighten and open up the area. The dark-red laminate contrasted with light wood cabinets in the kitchen visually separate this area and add color to the first floor. The natural wood framing around the windows and on the stairway polishes off the space.

Upstairs, the two bedrooms are fully carpeted and roomy, with floor-to-ceiling windows and plenty of closet space. The slanted roof in the upstairs bathroom contains a skylight to give full light and to visually open up this small room.

The house exterior is sided with pine clapboard finished with Cabot's Bleaching Oil. A graveled area under the overhang on the west wall lends itself to outdoor fun.

### Financing the home

Leytham planned the method of financing the house every bit as carefully as he tailored its design. Because the house can be built in 30 days, a construction loan with its relatively high interest rate and legal fees can be eliminated. Materials can be obtained on a contractor's standard 30-day credit line. Upon completion of the house, a permanent mortgage is financed. Mortgage financing must be arranged before day one of construction. **PM**



The master bedroom [top] has two floor-to-ceiling windows and is fully carpeted. The closet shown is one of a pair that flanks the bureau. A snack counter and the stairway separate the kitchen area from the dining room and the living room (above).

PM photos: Hanson Carroll  
 Stove: Vermont Castings, Randolph, Vt. 05060  
 Living room and dining room furniture: Pompanoosic Mills, East Thetford, Vt. 05074  
 Bedroom furniture: Work Space, South Washington, Vt. 05675  
 For information on obtaining plans for the house shown, contact Thomas B. Leytham, Chelsea, Vt. 05038.  
 The Compact House Book, with 33 house designs, is \$12.50 postpaid from Garden Way Publishing Co., 3513 Ferry Rd., Charlotte, Vt. 05445.



# Introducing CENTURY

Taste that delivers

IN THE MONEY SAVING

25 pack



Low Tar

Regular

Not available in all areas

Warning: The Surgeon General Has Determined  
That Cigarette Smoking Is Dangerous to Your Health.

LIGHTS: 10 mg. "tar", 0.9 mg. nicotine,  
FILTER: 16 mg. "tar", 1.1 mg. nicotine,  
av. per cigarette by FTC method



# Build This Versatile Handcart

This attractive handcart is strong, simply designed and easy to wheel—everything you'd want in a cart.

BY DAVID TRESEMER

**M**ost people don't realize that two-wheel handcarts have been used throughout the last 3,000 years for moving wood, weeds, rocks, compost and anything else that would fit in a cart. The failure of several modern handcarts is almost ludicrous in light of the fact that all design problems were solved hundreds of years ago.

The cart here optimizes strength and lightness, is easy to maneuver and uses accessories to adapt to many kinds of work. In the plan, the names of the cart parts come from the analogous structural members made by British cartwrights.

The standard or crutch (see I on the materials list) is traditional in carts and wagons and is often quite ornate. It supports the cart sides when gates are installed at both ends of the cart body. Though missing in most modern carts, the standard is extremely im-

portant for preventing the sides from bowing out.

One of our tests was to haul a 55-gal. drum half full of sand. Since the drum didn't fit into the cart, it exerted terrific pressure against the sides. Yet, they held. The best test, however, is to transport green firewood, load after load. Modern carts, which have gates but no standards, flunk this test.

The bolster (H) is a support for the standard, a fender for the tire, a step for children getting in and out and a seat for a trailer hitch. Since it is a frequently encountered part of the cart, grind its outer edges round.

When I first started working with this design, I wrapped the ends of the bolster in cardboard to save my shins. I was accustomed to carts which didn't stick out as far.

The spar (C) and spar brace (C1) are one unit. But the spar brace does most of the work. The four spars from behind each panel may be omitted, since they don't provide that much additional

strength. The soles (D), similar to the spars but in the bottom of the cart, shouldn't be omitted since they provide support for the floor.

The struts (J) are welded to the bottom rail just forward of the sole brace (D1) above the axle (M), and to the gate stop (F) at the front of the cart. The distance from the bottom rail to the ground is 13 in. You may prefer to have the struts shaped at a metalworking shop. If the struts are not perfectly matched, the cart will wobble a bit. However, it is very difficult to weld so that all four points, two tires and two struts, touch at the same time. Minor wobbles disappear when the cart is loaded.

The struts are the brakes of the cart. To slow down or stop, push down on the shafts (S) so the struts scrape along the ground. They should be of sturdy stuff, not flimsy tubular electrical conduit as in many modern carts. Use a 5/8-in.-dia. reinforcement bar. These struts do not go across the direction of travel, as in other carts where they catch the heels of the carter.

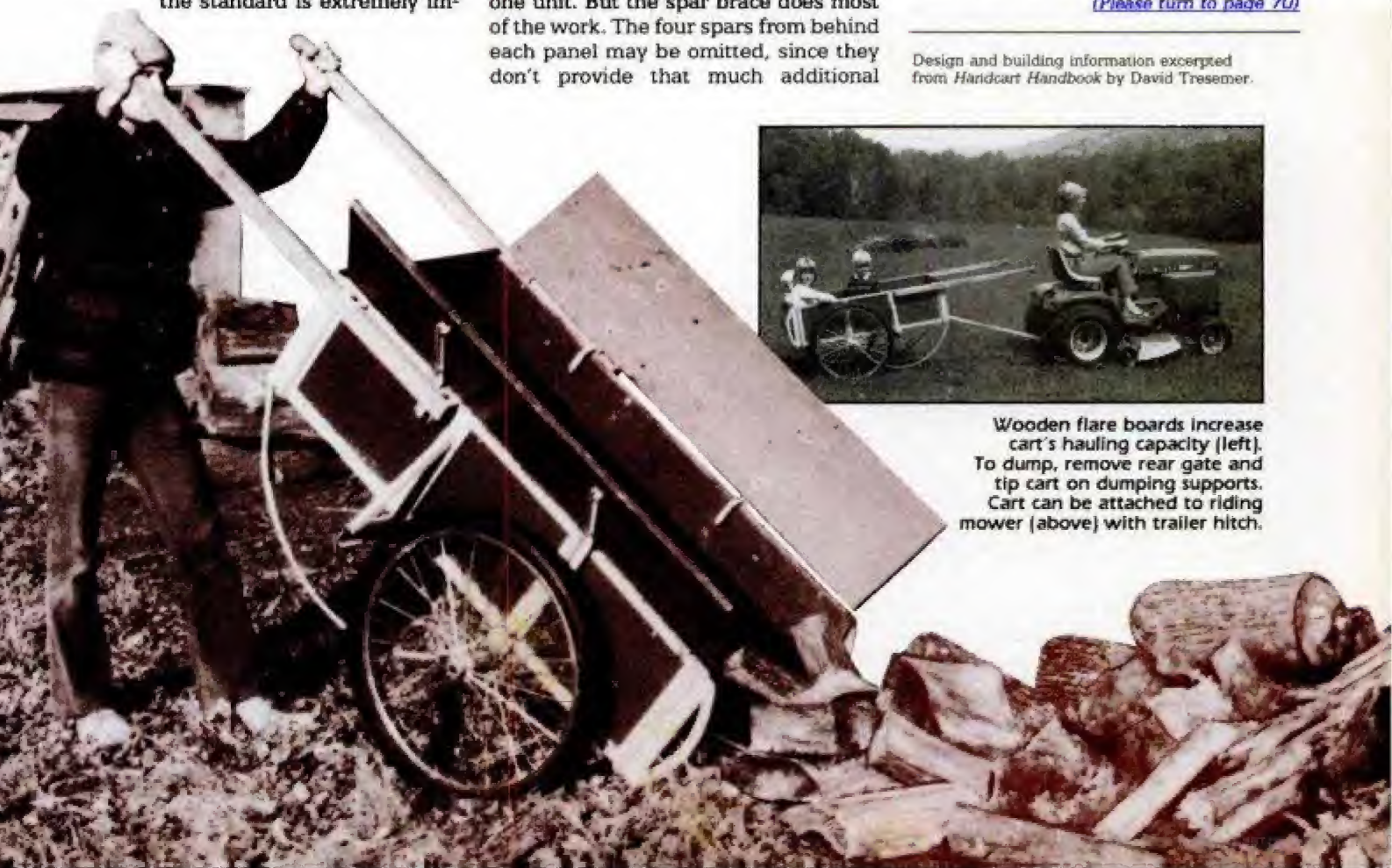
## Human harness

The trailer hitch tabs (Q) aren't only for small riding mowers. They can be used to attach a goat swingle and a human harness. The tabs must be notched before welding over the front sole brace.

The wheels (R) are placed to the rear of center because the most dangerous load is one that is placed too far back,

*(Please turn to page 70)*

Design and building information excerpted from *Handcart Handbook* by David Tresemer.



Wooden flare boards increase cart's hauling capacity (left). To dump, remove rear gate and tip cart on dumping supports. Cart can be attached to riding mower (above) with trailer hitch.



## HANDCART

(Continued from page 69)

tipping the cart up and perhaps hitting someone with the knobs of the shafts. The load should be centered just in front of the axle so most of the weight is borne by the wheels, but so that the cart rests firmly on the struts. When going up hills, the load should be even more forward. With the wheels placed to the rear, this cart feels heavier when empty than when loaded. With a load of hundreds of pounds balanced over the axle, the shaft can be lifted with one finger.

Construct a jig to hold the side parts at right angles to the bottom parts during welding. You can make the jig of 2×4s. Outside dimensions should be 12×24×48 in.

It is best to weld the cart upside down—first the bottom (bottom rails, soles and sole braces), then each side (spars, spar braces and top rail). When you're finished, tap or file away all excess spatters and grind down messy welds and sharp corners. Welding is best done with a wire-feed welder, since the more simple welders heat the metal so much that the pieces bend when cooling. If you use an arc welder, the top rails should be  $\frac{3}{8}$ -in. stock, or as wide as the bottom rails.

Drill the following holes:  $\frac{3}{4}$ -in.-dia. at

the end of the axle spar brace (L, see detail 2),  $\frac{3}{8}$ -in.-dia. in shaft tabs (K, see detail 3 and standard detail) for the bolts (T) which hold the shafts in place;  $\frac{1}{2}$ -in.-dia. in the trailer hitch tabs (Q) for a pin which holds the trailer hitch, if you plan on having a trailer hitch;  $\frac{1}{8}$ -in.-dia. on the axle ends for the cotter pins which secure the wheels;  $\frac{1}{2}$ -in.-dia. in the center of the bolster for a trailer hitch pin; and  $\frac{1}{8}$ -in.-dia. holes in three places of each top and bottom rail for bolts (Y) to secure the side panels.

The wheels (R) slide on the axle and are held in place by one or more large washers (Z1). The washers are held by cotter pins (Z) set through the end of the axle.

### Protecting the frame

Protecting the metal frame is best done in three steps. First, clean off the rust and dirt. Then etch the metal with an acid solution available at auto parts stores. Use extreme caution with these

(Please turn to page 72)

### MATERIALS LIST—HANDCART

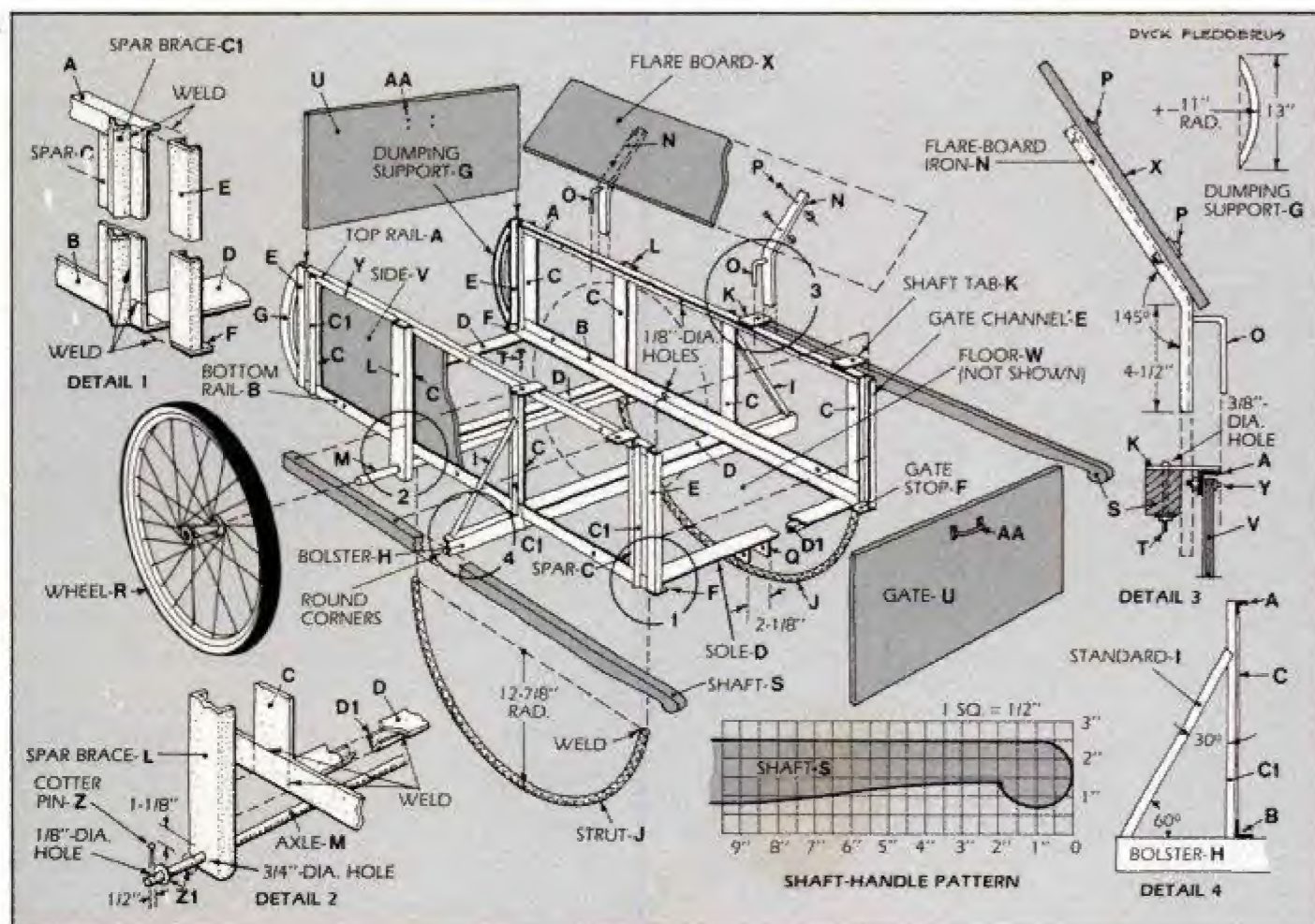
Key	No.	Size and description (use)	P	8	3/16"-dia. x 1 1/2" bolts, washers, nuts (for flare boards)
A	2	1/8 x 3/4 x 3/4 x 48" steel angle (top rail)			
B	2	1/8 x 3/4 x 3/4 x 48" steel angle (bottom rail)	Q	2	3/16 x 2 x 2" steel (trailer hitch tabs, optional)
C	8	1/8 x 2 x 10 3/4" steel (spar)	R	2	26"-dia. x 2.125 spoked wheel and tire with extra-wide spindle
C1	6	1/8 x 3/4 x 3/4 x 13" steel angle (spar brace)	S	2	1 3/8 x 1 3/4 x 48" ash (shafts)
D	4	1/8 x 2 x 21 3/4" steel (sole)	T	4	3/8"-dia. x 2 1/2" bolts, washers, nuts
D1	3	1/8 x 3/4 x 3/4 x 24" steel angle (sole brace)	U	2	1/2 x 12 3/4 x 24" plywood (gates)
E	4	1/8 x 1/2 x 1 x 1/2 x 12 3/4" steel channel (gate channel)	V	2	1/2 x 12 x 48" plywood (side panels)
F	4	1/8 x 1 x 1" steel (gate stop)	W	1	1/2 x 24 x 48" plywood (floor)
G	2	1/8 x 3/8 x 1 x 3/8 x 13 3/4" steel channel (dumping support)	X	2	1/2 x 12 x 48" pine (flare boards)
H	1	3/16 x 1 x 2 x 1 x 37 1/2" steel channel (bolster)	Y	12	1/8"-dia. x 1" bolts, with washers, nuts (for V)
I	2	1/8 x 3/4 x 3/4 x 13" steel angle (standard)	Z	2	2" cotter pins
J	2	3/8"-dia. x 44" steel reinforced (strut)	Z1	4	1/8 x 3/4 i.d. x 2" o.d. washers
K	4	3/16 x 2 x 2 1/2" steel (shaft tab)	AA	2	4" brass handles and eight 1/4"-dia. x 1" bolts with T-nuts
L	2	1/8 x 1/2 x 1 1/2 x 1/2 x 15 3/4" steel channel (axle spar brace)			
M	1	3/4"-dia. x 37" steel rod (axle)			
N	4	1/8 x 1/2 x 1 x 1/2 x 13" steel channel (flare board iron)			
O	4	1/4 x 1 x 4 1/4" steel (flare board hook)			

**Misc.:** Redi-Metal or other acid-cleaning solution, 1 pint metal primer, 1 pint metal paint, paint thinner, exterior enamel, penetrating oil.

**Note:** The following items are available through 1983 in the continental United States from Hand & Foot Ltd., Box 611P, Brattleboro, Vt. 05301: 2.125 x 26-in.-dia. spoked wheel and tire (\$69/pair), axle (\$8.70), shafts (\$25/pair), struts (\$10/pair). Write for postage rates.

**Misc.:** Redi-Metal or other acid-cleaning solution, 1 pint metal primer, 1 pint metal paint, paint thinner, exterior enamel, penetrating oil.

**Note:** The following items are available through 1983 in the continental United States from Hand & Foot Ltd., Box 611P, Brattleboro, Vt. 05301: 2.125 x 26-in.-dia. spoked wheel and tire (\$69/pair), axle (\$8.70), shafts (\$25/pair), struts (\$10/pair). Write for postage rates.





# Wealthy Man Wants to Give You His Wealth Secret Before It's Too Late!

Dear Friend,

My name is John Wright. Not too long ago I was flat broke. I was \$30,000 in debt. The bank repossessed my car because I couldn't keep up with the payments. And one day the landlord gave me an eviction notice because I hadn't paid the rent for three months. So we had to move out. My family and I stayed at my cousin's place for the rest of that month before I could manage to get another apartment. That was very embarrassing.

Things have changed now. I own four homes in southern California. The one I'm living in now is worth more than half a million dollars. I own several cars, among them a brand new Mercedes and a brand new Cadillac. And as of now, I have \$178,000 cash in certificate of deposits in just one of my bank accounts in Beverly Hills.

I'm not really trying to impress you with my wealth. All I'm trying to do here is to prove to you that if it wasn't because of that money secret I was lucky enough to find that day, I still would have been poor or may be even bankrupt. It was only through this amazing money secret that I could pull myself out of debt and become wealthy. Who knows what would have happened to my family and me.

Knowing about this secret changed my life completely. It brought me wealth, happiness, and most important of all peace of mind. This secret will change your life, too! It will give you everything you need and will solve all your money problems. Of course you don't have to take my word for it. You can try it for yourself. To see that you try this secret, I'm willing to give you \$20.00 in cash. (I'm giving my address at the bottom of this page.) I figure, if I spend \$20.00, I get your attention. And you will prove it to yourself that this amazing money secret will work for you, too!

You probably are asking yourself, why is he sharing his secret with me? My response is, "why not". First, I've already made enough money to retire for the rest of my life. Second, my secret is so unique that we won't be competing with each other. Third, nothing is more satisfying to me than sharing my secret only with those who realize a golden opportunity and get on it quickly.

This secret is incredibly simple. Anyone can use it. You can get started with practically no money at all and the risk is almost zero. You don't need special training or even a high school education. It doesn't matter how young or old you are and it will work for you at home or even while you are on vacation.

Let me tell you more about this fascinating money making secret:

## FAST MONEY

With this secret the money can roll in fast. In some cases you may be able to cash in literally overnight. If you can follow simple instructions you can get started in a single afternoon and it is possible to have spendable money in your hands the very next morning. In fact, this just might be the fastest *legal* way to make money that has ever been invented!

## ALMOST NO-RISK

This is a very safe way to get extra cash. It is practically risk free. It is not a dangerous gamble. Everything you do has already been tested and you can get started for less money than most people spend for a night on the town.

## "WORK" AT HOME

One of the nicest things about this whole idea is that you can do it at home in your spare time. You don't need equipment or an office. It doesn't matter where you live either. You can use this secret to make money if you live in a big city or on a farm or anywhere in between. A husband and wife team from New York used my secret, worked at home in their spare time, and made \$45,000 in one year.

## SIMPLE

This secret is simple. It would be hard to make a

mistake if you tried. You don't need a college degree or even a high school education. All you need is a little common sense and the ability to follow simple, easy, step-by-step instructions. I personally know a man from New England who used this secret and made \$2 million in just 3 years.

## AGE DOESN'T MATTER

You can use this secret to make money no matter how old or how young you may be. There is no physical labor involved and everything is so easy it can be done whether you're a teenager or 90 years old. I know one woman who is over 65 and is making all the money she needs with this secret.

## NO PERSONAL SELLING

When you use this secret to make money you never have to try to convince anybody of anything. This has nothing to do with door-to-door selling, telephone solicitation, real estate or anything else that involves personal contact.

## LEGAL AND HONEST

Everything about this idea is perfectly legal and honest. You will be proud of what you are doing and you will be providing a very valuable service.

## NO LONG HOURS

It will only take you two hours to learn how to use this secret. After that everything is almost automatic. After you get started you can probably do everything that is necessary in three hours per week.

I know you are skeptical. That simply shows your good business sense. Well, here is proof from people who have put this amazing secret into use and have gotten all the money they ever desired. Their names are not mentioned here in order to protect their privacy but I have full information and the actual proof of their success in my office.

## PROOF

- A woman from Oregon started out by using my secret method in its simplest form. She later reported that it had brought her \$14,000 in cash.
- A man from Rhode Island applied my secret and with the help of his family, made over \$40,000 in a year in his spare time.
- A man from California, who was broke at the time, tried my secret and made \$147,000.
- On the basis of my secret, a husband and wife team from Virginia grossed over \$100,000 cash in eleven months.
- A man from California made over \$265,000 in one year, with this incredible secret.
- I talked to a man from Ohio, who now lives in Santa Monica, CA. He said: "Thank you for sharing your secret...with this amazing, yet simple secret, I received \$220,000 in just two months."

As you can tell by now I have come across something pretty good. I believe I have discovered the sweetest little money-making secret you could ever imagine. Remember — I guarantee it.

Most of the time, it takes big money to make money. This is an exception. With this secret you can start in your spare time with almost nothing. But of course, you don't have to start small or stay small. You can go as fast and as far as you wish. The size of your profits is totally up to you. I can't guarantee how much you will make with this secret but I can tell you this — so far this amazing money producing secret makes the profits from most other ideas look like peanuts!

Now at last, I've completely explained this remarkable secret in a special money making plan. I call it "The Royal Road to Riches". Some call it a miracle. You'll probably call it "The Secret of Riches". You will learn everything you need to know step-by-step. So you too can put this amazing money

making secret to work for you and make all the money you need.

To prove that this secret will solve all your money problems, I'm not even asking you to send me money. Instead, postdate your check for a month and half from today. Obviously it is not actually money because it is not negotiable for 45 days. You can easily stop payment on it any time you want. I can't cash your check for 45 days before I know for sure that you are completely satisfied with my material.

## IMAGINE HOW YOUR WHOLE LIFE WILL CHANGE IF YOU USE THIS SECRET TO GET ALL THE MONEY YOU NEED!

- You won't have to worry about bills.
- You will be master of your own time and fate and nobody can boss you around.
- You will have more time to spend with your loved ones and you will be able to take care of them in emergencies.
- You can have the house you want, the car you want, the vacations you want.
- And most of all, you will finally have PEACE OF MIND!

If you need (or just want) more money, there are a lot of reasons why you should take advantage of this amazing secret. (And I can't think of a single reason why you shouldn't.) It will probably solve all your money problems forever. In fact, I am so completely convinced that my powerful secret works money miracles, that I'm willing to give you the most unusual *guarantee* ever offered. That is, if it doesn't solve all your money problems, I'll return your original uncashed check, plus an extra *twenty dollar cash bonus* just for doing me (and yourself) the favor of giving the secret an honest try according to my simple instructions.

## \$20.00 FREE!

There is no way you can lose. You either solve all your money problems with this secret (in just 30 days) or you get your money back *plus* \$20.00 in cash **FREE!**

Do you realize what this means? You can put my simple secret into use. Be able to solve all your money problems. And if for any reason whatsoever you are not 100% satisfied after using the secret for 30 days, you may return my material. And then I will not only return your original UNCASHED CHECK, but I will also send you an extra \$20.00 cashiers check just for giving the secret an honest try according to the simple instructions.

**I GUARANTEE IT! I have given references, therefore, there is absolutely NO RISK ON YOUR PART.**

To order, simply write your name and address on a piece of paper. Enclose your postdated check or money order for \$12.95 and send it to:

**WRIGHT PUBLISHING COMPANY**  
Dept. 151  
3340 Ocean Park Blvd., Suite 3065  
Santa Monica, CA 90405

But the supply of my material is limited. So send in your order now while the supply lasts.

If you wish to charge it to your Visa or MasterCard — be sure to include your account number and expiration date. That's all there is to it. I'll send you my material right away by return mail, along with our unconditional guarantee.

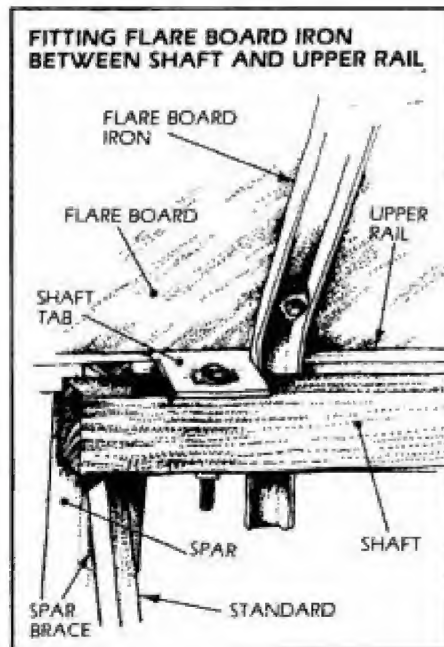
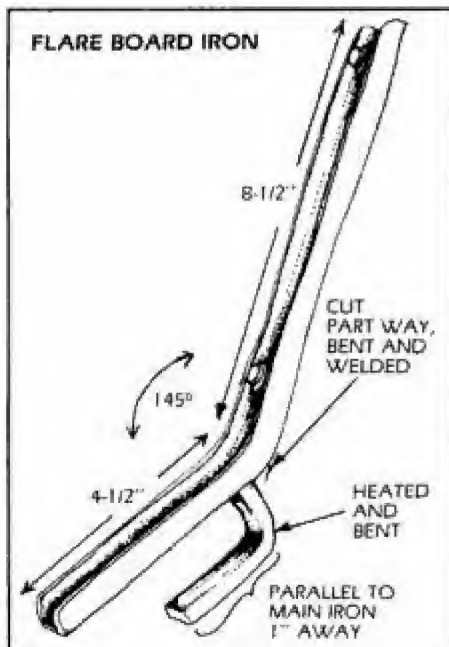
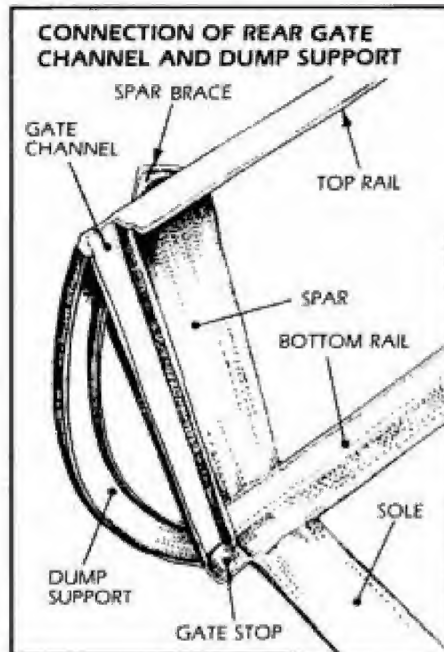
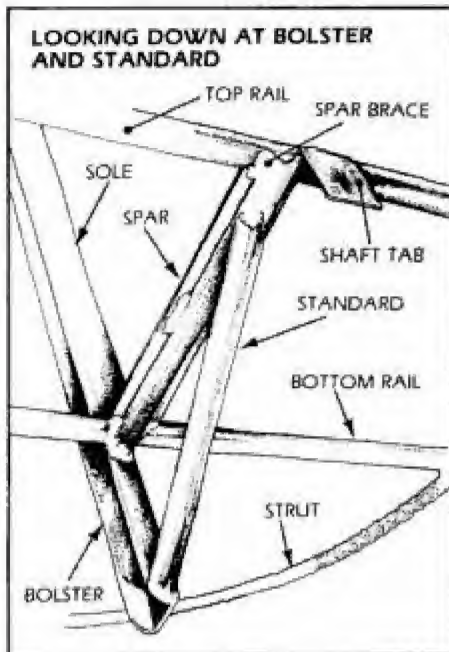
## REFERENCES:

We belong to Los Angeles Chamber of Commerce, located at 404 South Bixel Street, Los Angeles, California 90017.

Our bank reference is: First Los Angeles Bank, Los Angeles, California 90067.

©1981 Wright Publishing Company





## HANDCART

(Continued from page 70)

chemicals. Wear a fume mask and handle them carefully. Second, prime the metal to protect it. Third, paint with at least two coats of paint for metal to protect the primer and give the desired color. Rustoleum primer and paint is a good choice.

You can expect to use about a pint of primer and a pint of paint plus thinner. Check the coat once a year. If a rust patch develops, sand and repaint the area.

### Constructing the wood body

Although you can make beautiful cart bodies of hardwood, painted plywood is more practical. Bright colors and contrast between the plywood body and metal frame are traditional for country and city carts.

Begin work by cutting the floor (W) and the two side panels (V). Cut the gates (U) to fit the gate channels after the frame is made, in case the frame warps during welding.

Measure the cart carefully before cutting the wood. Fill any holes or gaps in the wood with wood filler. Then paint the panels, floor and gates with two or more coats of an exterior-grade enamel.

Lay the floor in place and press the two side panels in place so they hold the floor. Bolt each panel in three spots through both the top and bottom rails. Attach brass handles (AA) to the gates with bolts and capnuts.

### Shaping the shafts

It's more efficient to pull a cart with shafts (S) than to push it. Throughout history, two-wheel carts have been pulled, not pushed.

Make the shaft of a straight piece of ash. Rough-cut the knob end with a handsaw. Finish the inside corner with files, rasps and sandpaper. The shaft is bolted from under the shaft tabs. It rests firmly against the front two spar braces. This leaves distance between the shaft and top rail for the flare board irons (N). The flare boards (X) increase the size of the load that the handcart can carry.

Oil the shaft with light penetrating oil. The area around the shaft tabs should be oiled once a year.

### Wheels and flare boards

The wheel that I prefer is large (26-in. dia.) and wide (2.125 in.), with thick spokes (.156 in. versus .080 in. found on most bicycles). The spokes should be welded to the hub and rim. Each of the wheels should have two sealed ball bearing units.

Heavy tread pneumatic tires smooth out the ride by flexing around small bumps. The tires should be inflated to at least 30 pounds per square inch and as high as 50 p.s.i. But the best guide is the shape of the tire when the cart is loaded.

Flare boards can be added when needed to extend the sides of the cart. Flare board irons attach the boards to the cart. Cut the main part of the iron (N) and bend it 35° to form a 145° angle. Cut and bend a hook (O) and weld it in place on the iron, so the space between them is 1 in. Then drill 5/16-in.-dia. bolt attachment holes in the iron and flare board.

The flare boards (X) are made of 3/4-in. pine. A 12-in. width is good for most purposes, but you may prefer a different size. Paint the wood and metal as described for the cart body, then bolt the parts together.

### Boards won't slide

Place the irons on the wood so they ride on the top rail. The front iron rests against the front of the second shaft tab (see fitting flare board detail). The rear iron rests against the rear end of the axle spar.

This iron placement ensures that the boards won't slide when the cart moves. However, it also means that the two boards aren't interchangeable. If the boards are mixed, one of the gates can't be removed.

Accessories you can build for the cart include a trailer hitch, human harness, sled, compost screen, farmer's market tray, taxi, goat harness, animal cage and winch.

There are also ways you can rebuild other two-wheel handcarts. Details are in the *Handcart Handbook* (\$6.95 postpaid) from Hand & Foot Ltd., Box 611P, Brattleboro, Vt. 05301, telephone (802) 254-2101.

FM



# SOTZ MONSTER MAUL

FAST-N EASY WOOD SPLITTING

12-LB.  
HIGH CARBON  
STEEL HEAD

HIGH STRENGTH STEEL HANDLE

1-YEAR TRIAL OFFER  
AT OUR RISK

HARDENED  
SPLITTING  
EDGE

## \$24.94

DELIVERED (INCLUDES TAX)  
LOWER PRICED THAN IN 1980

### OUR 27th YEAR

- Ends broken handles, stuck axes and flying wedges.
- Hardened splitting edge lasts and lasts. Resists deforming.
- Splits most logs in one lick.
- No struggling lifting heavy logs up to high priced power splitters.
- No gasoline, no set-up, no takedown.
- Shape of head prevents sticking.
- Drop'em, saw'em, stand'em up and split'em.
- No gimmicks, just simple physics.

### GUARANTEED 10 YEARS AGAINST FAILURE

For many years, you've seen our ads and read unsolicited letters from folks just like you, saying how unbelievably effective the Monster Maul really is. Try a **MONSTER MAUL AT OUR RISK!** Within one year, if you don't think it's the fastest, least tiring method of splitting firewood, let us know, and we will give you your money back, including shipping... plus it's guaranteed against failure for 10 years.

Weight: (Total weight 15 lb.)  
Price: **\$19.94** Factory pickup.  
**\$24.94** Delivered to your door.

VISA or MASTERCARD RUSH ORDERS  
CALL TOLL FREE 1-800-321-9892  
Inside Ohio 1-216-236-5021  
OR SEND CHECK OR MONEY ORDER.  
Sorry No C.O.D.'s

Sotz Inc., 13643 Station Rd., Columbia Station, OH 44028



### DON'T GET STUCK!

You guys just saved me \$175. I had been convinced "The Stickler" was the fastest and best log splitter you could get. I was resigned to paying the \$200 for it when I saw your ad and thought, "What the heck, for \$25 I can't go wrong." Well your Monster Maul worked faster than the Stickler and gives me some good exercise. Continue the good work. Enclosed is a check for your lift-n-saw. I'm looking forward to using it and I hope it will come in as handy as your Monster Maul.

Ernest A. Updike, Tonopah, NV

### A GIFTED GAL!

I have just finished reading several Sotz letters from satisfied customers in Organic Gardening magazine. Most of the letters are about the 15# (total weight) splitting maul. As a petite woman I have a fairly difficult time with that maul. Last Christmas one of the best gifts I received was your 11# (total weight) maul from my husband. Surely there are many women out there who would love to know the lightweight version is available. Why don't you advertise it along with the other? I'm sure you would top quite a large consumer group. A Satisfied Mini-Monster-Maul owner.

Carolyn Hewes, Fort Jones, CA  
(Consider it advertised! The lady's maul may be purchased for just \$21.50 delivered, and \$18.50 factory pick up.)

### NEVER TOO YOUNG!

I received my Monster Maul and proceeded to use it but I did not expect it to cut wood with the ease that it did. It works good for young man like me, I am nearing 77, an ex-logger. I have split cords of rich wood and cord wood but not with a good tool as that maul.

M.J. Powell, Battle Ground WA

### THAT GOOD FEELING

I'm retired from the Army after seventeen years over injuries I received in Vietnam, one being a back problem. My wife and I try to heat our home with wood. Up until last year we had to stick with smaller trees because there was no way I could split wood with an axe or wedges, without a lot of frustration and then spending the following couple of weeks in bed. Then we ordered your Monster Maul. I'm cutting larger trees, which is giving the smaller ones a chance to grow and our wood shed is full of split cherry, locust, and oak, with very little pain or problems. You make a very fine product. It does all if not more than you advertise. Now I have to try your Lift N Saw. Enclosed is an order for one, plus an order for two more Monster Mauls. Mine convinced a friend and a brother-in-law that they needed one too.

Donald E. Taylor, Grandview, IN

### SUPERIOR

Just a note to let you know how pleased we are with the Monster Maul - it's GREAT! It's reassuring to receive an item by mail which lives up to (and actually surpasses) our initial expectations... an additional "Thank You" for your quick delivery of the woodstove tools, wood carrier and "ears". As expected they represent a superior value at a most modest price. Good luck to your business.

Wm. Fish, Manchester, NH



# CURE FOR THE COMMON COLD.



Bitter cold strikes young and old alike. And about all you could do before Thermolactyl was relieve the symptoms.

You could try to block the icy winds with layers of bulky clothing. Or wear old-fashioned long johns and perspire the moment you step indoors.

But now Damart is offering a cure you can live with (and afford!): Form-fitting underwear made of Thermolactyl, a manmade fiber much warmer than cotton or wool and also much lighter!

Damart Thermolactyl retains your body heat. And yet it b-r-e-a-t-h-e-s, allowing perspiration to evaporate. So you feel warm and dry, not cold and clammy. You're comfortable outdoors and indoors, too.

No wonder more than 1,000,000 Americans already wear Damart Thermolactyl for outdoor sports or to prevent nagging aches associated with cold and dampness. No wonder it's the choice of polar and Himalayan expeditions, the Ladies Professional Golf Association, and the Jets, Patriots, Bears, Bills, Steelers, Eagles and Packers football teams.

Damart's colorful catalog features form-fitting tops and bottoms in all sizes (including tall) for both men and women. You'll also find caps, glove liners, socks, even thermal lingerie!

Send for your catalog right away. Not only will you survive the common cold; you'll thrive in it!

## Damart

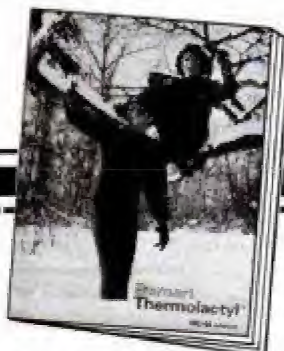
Mail to: DAMART, Dept. 34068  
1811 Woodbury Avenue  
Portsmouth, N.H. 03805

**FREE CATALOG** Yes — rush your catalog of warm but lightweight Damart Thermolactyl. I understand there's no obligation at all.

Name \_\_\_\_\_ (please print)

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_



**WARMTH WITHOUT  
WEIGHT OR WETNESS.**



© 1983 Damart

## HINTS FROM READERS

### Window cleaning easel



My annual storm window cleaning session often left me with pains in my lower back. Now, to eliminate unnecessary stooping, I position sawhorses at right angles to an exterior wall and place the windows on them at a convenient height for work. —A. Weber

### Storing metal stock safely



To reduce shop injuries, "pull the teeth" of bars, rods and other metal stock stored for future use. Whenever a piece is sawed from some metal stock, file off the sharp edges and corners on the remaining portion before storing it. Later, you'll be less likely to cut yourself when searching through the assortment of stored items. Work gloves add protection, too. —W.E. Burton





## THE RADAR DETECTOR GOOD ENOUGH FOR ONE OF THE WORLD'S FASTEST DRIVERS.

Bobby Unser. Three time Indy 500 winner. He's won enough races to have any radar detector. But he uses the new Regency.

What's the reason? We didn't know. So we called Bobby Unser. And got the straight story. Here's what he said.

"We tow race cars all over the country. Nearly all year long. It costs a lot of money. So we really don't appreciate those special tolls called speed traps. I needed a radar detector, and wanted the best. But I didn't know which one to buy.

So I checked with the guys at Regency. I've been using their two-way radios for years, and they work real well. It made sense that they'd know which detector to get.

Only I never expected the answer I got. They told me not to buy a radar detector. Seems I called at the right time. They were working on one and wanted me to try it. OK, I said, but why is yours better than that famous brand everybody talks about? Well, they said with that one I'd be paying too much and wouldn't get any more.

Why's that? Well a detector is basically a radio. Those other guys were the first with a superhet design. And back then, they beat the pants off the older style radar detectors. But really, superhet designs have been around in the radio business since the twenties. So there was no new magic. The guys at Regency said they knew how to make a good radio, and the same stuff makes a good radar detector.

The main trick is to get it real sensitive to what you want to hear, and reject what you don't want. I got mine and found that the Regency did just exactly that. It picks up the speed traps over hills, around corners and far away. Yet it doesn't confuse you with any of the other microwave signals running around. And it does a super job on both X and K band from moving or stationary guns.

A couple of other features make my Regency radar detector special. It beeps and lights to let you know there's a radar gun around. When you're far away, it goes slowly. The closer you get, the faster it flashes

and beeps. So it's like a distance meter, but easier to use. Plus you can set it for just the flasher, or just the beeper or both. It even tells you if there's radar coming up behind you, because the Regency is good enough to pick up deflected signals.



I like the fact that it has three types of mounting hardware. We Velcro® mount it to the semitruck. Use the bracket for the windshield of our pickup. Or we mount it on the sunvisor in the cars. It only takes a couple of seconds to put it on. So I just carry it with me, in my briefcase or my helmet bag, all the time.

Now I don't want you to get the idea I'm advocating speeding. I'm definitely not. A lot of people and cars just aren't good enough to be going fast. And those that are should be doing it on a race track. There are plenty, all over the country. But if those revenue speed traps where they write you for 56, 57 or 58 bother you like they do me, get the Regency radar detector. I know I definitely wouldn't be without mine."

Bobby Unser drives cars that cost \$300,000 and up. With engines that cost \$48,000 a crack. Which means he's a pretty good judge of equipment. So if he said the Regency radar detector was the one, it really meant something.

The other side of the equation was Regency. It turns out that they've been in the electronics business for over 35 years. And they sell nearly 100 million dollars worth of electronics equipment a year. Not bad. Must be doing something right.

So we had two sources. Both of them with good track records. And both of them saying that this new radar detector was something very special. That was all we needed. We got in touch with Regency and made a deal to handle only their new radar detector. Which puts us in a very unique position to make you a very unique deal.

Order the Regency RS Two and put it in your car or truck. There's even a hidden remote mount version if you're worried about the midnight auto supply. Then try out the Regency, just like Bobby Unser did.

If you aren't 100% satisfied with its super long range sensitivity, compact easy-to-mount size or its interference free alerting system, simply return it to RCD within 25 days for a courteous refund. There'll be no hassles, no problems.

To order the Regency RS Two pictured above with your credit card, call toll free or send your check for just \$199.95 plus \$4.00 postage and handling. The hidden remote RS Three can be yours for only two hundred forty nine plus four dollars postage and handling.

The new Regency detector is backed by a one year limited warranty, a 100 million dollar manufacturer, and it's the choice of a guy who's as casual about doing over 200 mph as most people are about driving to the corner grocery store. Not a bad track record for such a new product. Get your own while our supply lasts.

RCD

806 CUSTER AVENUE  
P.O. BOX 1494  
NORFOLK, NEBRASKA 68701  
call TOLL FREE 800-228-8108



# FIRSTHAND REPORT

## Riding The Suzuki GS550E:

# BACK ROAD CHARGER SUPREME

The closest thing to race-bike handling you can buy for the street.

BY RAY HILL, OUTDOORS EDITOR



Whether you're straight-line cruising or back-road blasting, the GS550E is at home. Ground clearance in turns is excellent.



Instrument panel is stylish and functional. A digital readout on the panel lets you know which gear the six-speed tranny is in.



Antidive unit on the front of the fork leg above the axle does a good job of preventing the forks from diving rapidly.

**T**here are two kinds of motorcycles—those that are fun to ride and those that aren't. Suzuki's new GS550E definitely falls into the fun category. It's one of the best handling street motorcycles I've ever ridden. In the 550-cc class, it's the performance king.

From a standing start it can rip through the quarter-mile in less than 12.5 seconds at over 105 mph. Top speed is about 117 mph. A few years ago such performance couldn't be obtained from motorcycles that displaced 750 cc or more. Now it's available in a mid-sized 550.

Even more impressive are the bike's handling characteristics. So far, I've ridden the bike 2,500 miles over all types of roads: interstates, bumpy

paved roads filled with heavy city traffic and crooked back roads. It works well in all these situations.

The brakes are outstanding. The front brake lever feels a bit soft, but most street Suzukis I've ridden lately have a similar soft feel. And that doesn't lessen the twin front-calipers' stopping ability. You can lock up the front wheel with two fingers.

Another nice feature is the front brake antidive system. Some antidive units are more for marketing purposes than performance. A hard pull on the front brake lever by an experienced rider makes the front end dive as quickly and as far as if no antidive system is in place. But the antidive unit on the 550 Suzuki really does slow down the front

fork's rate of dive—particularly useful if you're braking very hard and heading into a sharp turn.

Where this motorcycle really shines is on crooked back roads. Steering is more precise than any street motorcycle I've ridden, regardless of size. This is partly due to the motorcycle's 16-inch front wheel. Until this year, most street bikes had 18- and 19-inch front wheels. Reducing the front wheel diameter to 16 inches makes for a quicker-steering motorcycle. And in the Suzuki's case, the overall steering geometry is such that you get quick steering along with precision steering—which in the real world means that you can change your line instantly in a corner, even if the pavement is





Rear spring-preload on the single rear shock can be adjusted with the turn of this wheel, which is located behind the engine.



The fuel tap is positioned behind this flimsy plastic door. On a cold day with thickly gloved hands, turning the tap isn't easy.

bumpy. The 16-inch wheels were first tried on GP racing bikes a couple of years ago. They worked so well there that they are now beginning to filter down to production street bikes.

The four-cylinder dohc engine has four-valve cylinder heads and a pair of 30-mm, two-barrel Mikuni carburetors (one barrel per cylinder). An external oil cooler keeps the engine oil from getting too hot.

The only two drawbacks I found with the engine are these: It's cold-blooded—you can't put the choke in the off position for several minutes. And the engine doesn't have a lot of low-end or mid-range power. It doesn't start making neck-snapping power until about 7,000 rpm. But when it does, you had best be hanging on. From 7,000 rpm up to the engine's 10,000 rpm redline, this 550 accelerates with the surge and authority of a much larger motorcycle.

Fuel economy is good. The lowest mileage I recorded was 40 mpg, with the bike ridden very hard, and the highest was 56 mpg, with the machine ridden sedately.

Suggested retail of this little tiger is about \$3,000. That's not bad for the best 550 you can buy.

**FM**

# CANADA AT ITS BEST.

Light. Smooth. Imported Canadian Mist®  
The whisky that's becoming America's favorite Canadian



*Share some tonight.*

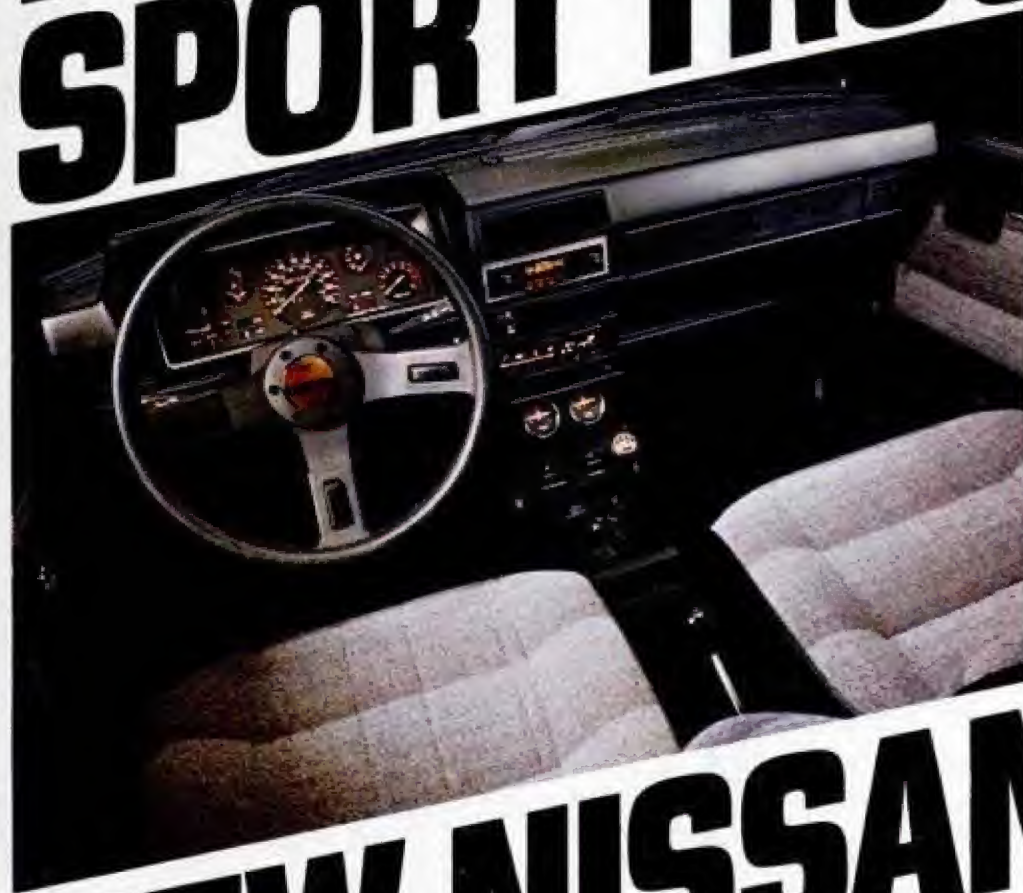
IMPORTED BY B-F SPIRITS LTD., N.Y., N.Y. CANADIAN WHISKY—A BLEND, 80 PROOF, © 1983

Photographed at Stanley Glacier, Kootenay National Park, Canada

Manufactured and Bottled in Canada



# ONE HUNK-OF-A SPORT TRUCK!

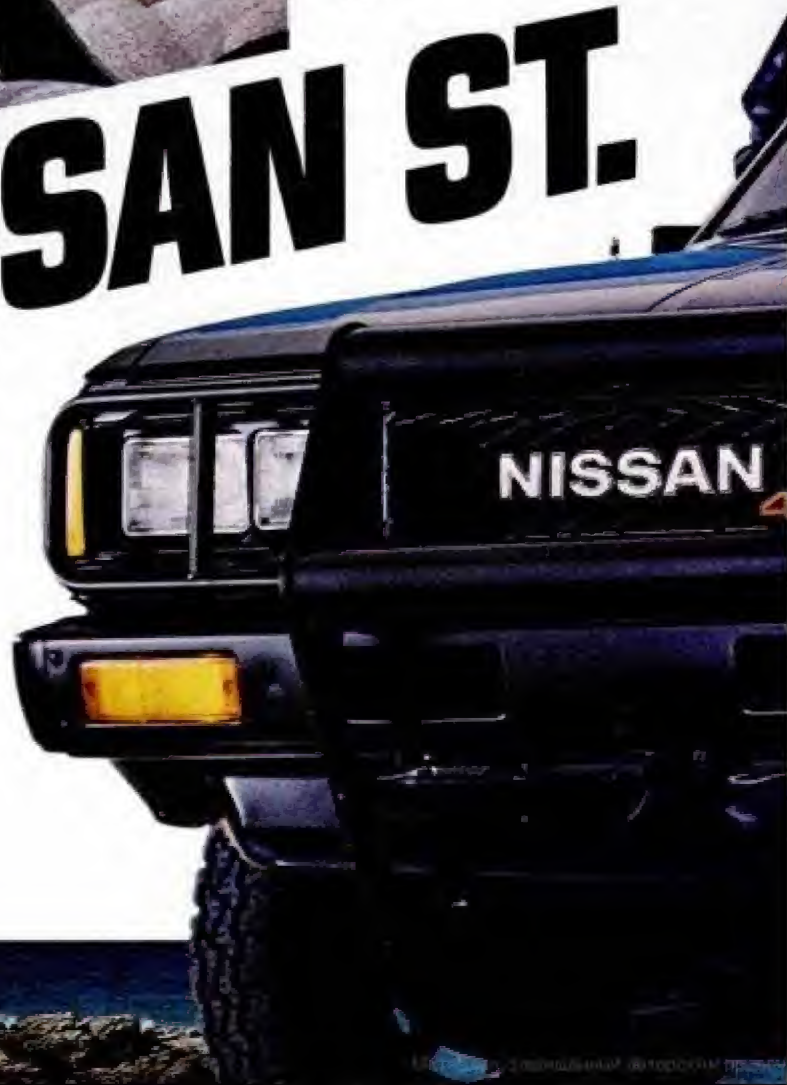


## MORE OF A SPORT FOR LESS THAN YOU THINK.

- Nissan gives you all this truck equipment standard:
- Outline white letter steel-belted radial tires on white spoker wheels.
  - 5-speed overdrive transmission.
  - Full instrumentation; including quartz analog clock.
  - Bucket seats—adjustable lumbar support on driver's side.
  - Leather-wrapped sports steering wheel.
  - Cloth upholstery on seats and doors.
  - Thicker carpeting than Toyota.
  - AM/FM multiplex stereo.
  - Power steering with tilt steering column.
  - Day/Night anti-glare rear-view mirror. Dual outside mirrors.
  - Sliding rear window.
  - Sunroof.

# NEW NISSAN ST.

NOW AT YOUR DATSUN DEALER





- And more standard features unavailable in the competition at any price.

**PLUS:**

- More hiproom than Chevy S-10 or Toyota.
- More legroom than Toyota.
- More headroom, legroom, seatback rake than in any Nissan-built standard compact truck ever.

### THE MOST POWER OF ANY STANDARD ENGINE IN THE CLASS.



More than Toyota, Chevy S-10, Ford Ranger and all the others.

- Most horsepower: 103 hp @ 4800 RPM.
- Most torque: 133 ft.lbs. @ 2800 RPM.
- Exclusive NAPS-Z overhead-cam engine.
- Two sparkplugs per cylinder, crossflow hemihead and unique "fast-burn" design give maximum efficiency, minimum pollution.

### 2WD AND 4WD.

- Unique grille and bumper designs for contemporary styling: sleek in 2WD; rugged-looking in 4WD.
- On-demand 4-wheel drive. Unavailable in Toyota.
- Highest minimum ground clearance of any compact 4x4. Higher than Chevy S-10, Toyota, Ford Ranger.
- New wide-clearance torsion-bar independent front suspension for a smooth, level ride.
- Tightest turning circle for maneuvering. Runs rings *inside* Chevy S-10, Ford Ranger, Toyota.
- Front stabilizer bar; wide rear track for solid stance.

### DOUBLE-WALL CONSTRUCTION.

- Nissan wraps the bed in double steel walls to help prevent damage to cargo box's exterior from shifting cargo.



- Welded steel ladder-lattice chassis—like the big rigs.
- Tailgate lowers 90°, 180° or removes entirely to carry your load.

### ONE HECK-OF-AN INVESTMENT.

Nissan-built trucks are built to last. Eight of every ten Nissan-built trucks sold in the past 23 years are still working hard, playing hard. Visit your Datsun dealer and see the exciting new full line.



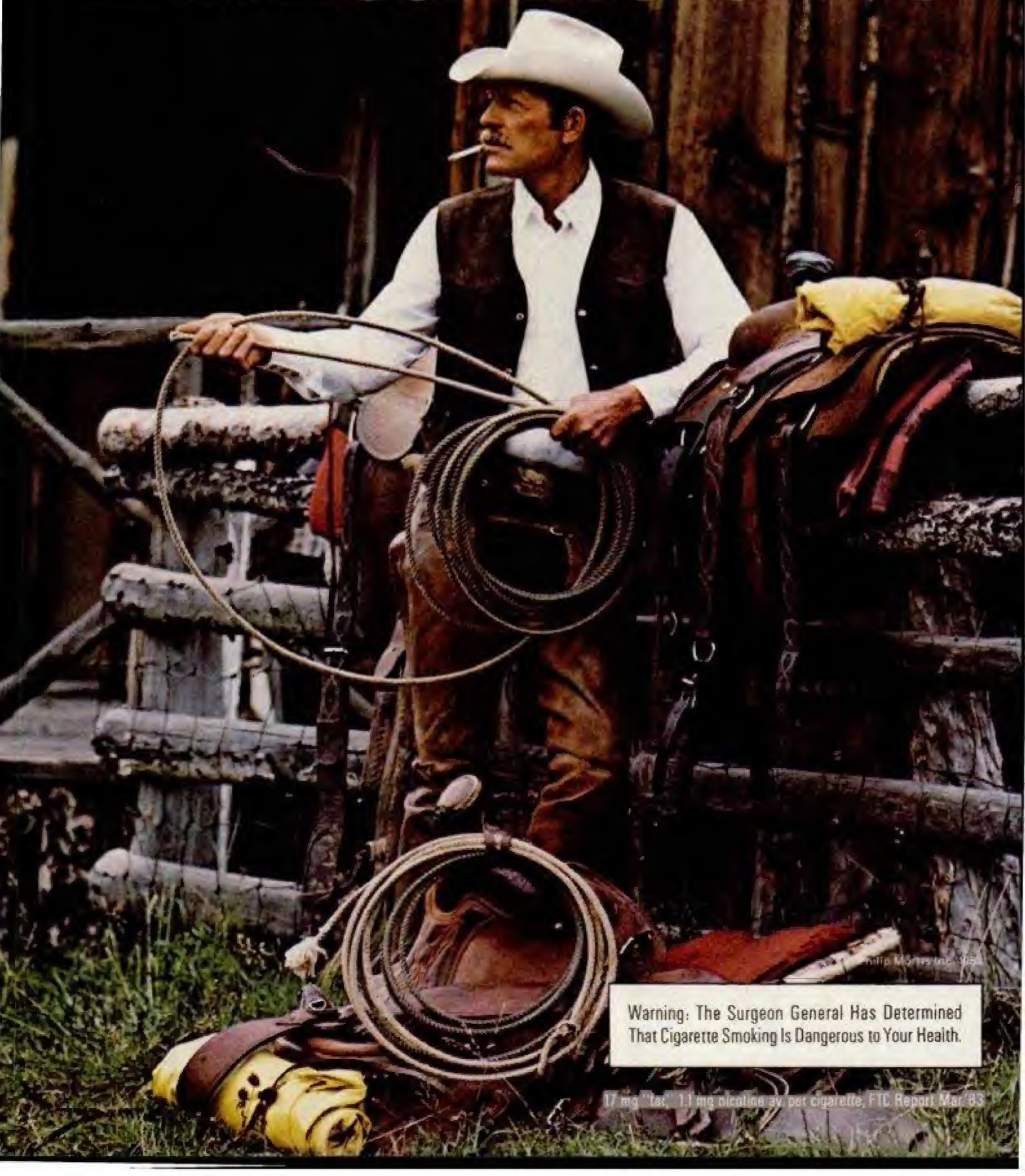
# NISSAN







# Marlboro



Warning: The Surgeon General Has Determined  
That Cigarette Smoking Is Dangerous to Your Health.

17 mg "tar," 1.1 mg nicotine av. per cigarette, FTC Report Mar '83



# NASA

## 25 GREAT YEARS OF SPACE EXPLORATION

The National Aeronautics and Space Administration planned man's boldest quarter century.

BY DENNIS ESKOW AND TERENCE DICKINSON



**T**he chariots bore the names of gods like Mercury, Thor and Apollo. And the men who rode them were bigger than life. Names like Neil Armstrong, Gus Grissom, Alan Shepard and John Glenn bring to mind the most earthshaking news of our lifetimes: Man had leaped out of his daydream into outer space. An American flag stood unfurled on the surface of the moon. We looked at snapshots from the surface of Mars. Russians and Americans shook hands in orbit high above the troubled Earth. The space age had exploded on the scene and we were launched into a new age.

It seems as though the National Aeronautics and Space Administration (NASA) has been around forever. But the agency was signed into existence by President Eisenhower just 25 years ago this month. Few men believed we'd be cruising routinely in space so quickly. Indeed, few enterprises have enjoyed so much success so quickly, despite natural obstacles and two major calamities that nearly brought the American space program to a precipitous end.

NASA was born a year after the Russians stunned the world with the launching of Sput-

Neil Armstrong's 1969 moonwalk was NASA's triumph. Original seven astronauts (inset) mug during survival mission.



# NASA 25

nik I, the first artificial satellite to orbit the Earth. America itself had already begun planning some form of space exploration, but for much further into the future. With Sputnik came a whole new jargon, beginning with the phrase "space race." The Russians rubbed it in, making the race all the more crucial to the thinking of American scientists. One Pravda editorial said, "The so-called system of free enterprise is turning out to be powerless in competition with socialism."

For a while, it seemed, the Soviets were right. The American program got off to a wobbly start. In 1958, 10 of America's 17 space launches ended in failure, with the rockets destroyed on the launch pad or over the ocean tracking ranges. The Americans had used the Navy's Vanguard rockets, but they suffered from technical problems.

It was a Jupiter C rocket that carried America's first satellite into orbit on Feb. 7, 1958. The 31-pound Explorer satellite was launched under the aegis of NASA's predecessor agency, the National Advisory Committee on Aeronautics (NACA), under the supervision of rocket scientist Werner von Braun and astronomer James Van Allen. Sensors aboard the Explorer detected radiation in space, confirming the existence of the Van Allen radiation belts.

By 1961, NASA was hot on the heels of the Russians, using the highly successful Mercury-Redstone rockets developed by the Army. On Jan. 31, 1961, MR-2 launched a chimpanzee named Ham into Earth orbit. He spent a week in space and survived re-entry. Ham died earlier this year at age 26.

By 1960, the Thor-Able rocket series had put the Pioneer 5 satellite into solar orbit and put the first functioning communications satellite into Earth orbit. And the X-15 one-man vehicle, launched from the wing of an airborne B-52, helped train a new generation of subspace hypersonic pilots.

Watching over their shoulders now, the Soviets launched Yuri Gagarin for one Earth orbit on April 12, 1961. But in manned flight, NASA refused to be stampeded, opting for maximum safety for its astronauts.

The first seven astronauts, all military test pilots, were introduced to a somewhat skeptical public in early 1959. Hamming it up as nomads in the

The X-15 was NASA's first piloted vehicle. It flew just short of outer space.



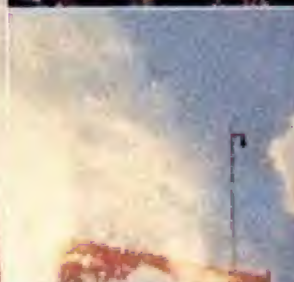
John Glenn became the first American to orbit the Earth on Feb. 20, 1962.



Ham returned from orbit Feb. 5, 1961.



Thor rocket (right) lifts off in November 1961. Vanguard (below) exploded in July '59.







Gemini IV's Ed White took man's first walk in space on June 6, 1965.

Alan Shepard became America's first man in space on May 5, 1961.

Skylab, launched in May 1973, was our first orbiting lab. It paved the way for American Tom Stafford to meet Russian Anton Leonov in orbit on July 30, 1975 (below).



Col. Edwin Aldrin Jr. posed for Neil Armstrong on the historic first moonwalk, July 19, 1969.

Astronauts Roger Chaffee, Ed White and Gus Grisson (left to right) in training a few days before they died in a launch-pad fire on Jan. 27, 1967.





In June 1960, Pioneer 5 orbited the sun, opening up a new era of space-based astronomy.



American Sally Ride became the country's first spacewoman last summer.



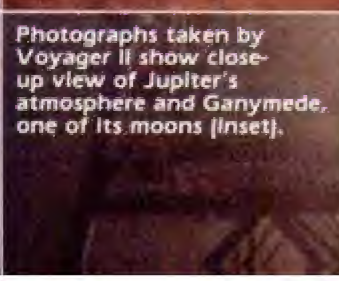
Space shuttles ascending on recoverable boosters have opened new vistas in space industry. Future developments will be shuttle-based.



Viking lander's robot camera booms gave us Martian landscape photos from 1975-1982.



Photographs taken by Voyager II show close-up view of Jupiter's atmosphere and Ganymede, one of its moons (inset).





desert training photo on page 81 are (left to right) Gordon Cooper, Scott Carpenter, John Glenn, Alan Shepard, Gus Grissom, Walter Schirra and Deke Slayton. A year after Gagarin completed his single orbit, Shepard became the first American in space, traveling 116 miles up and 303 miles over the Atlantic tracking station. On Feb. 20, 1962, Glenn orbited the Earth three times in the Friendship 7 capsule.

Meanwhile, the Americans were experimenting with what was to become their space forte—data-gathering satellites. Pioneer, Discoverer and Explorer satellites sent back radio and camera records of the surfaces of the Earth and moon. In the decades that followed, the NASA satellites would fly by Jupiter and Saturn, circle Venus and take scouting photographs of the Martian surface. America's Viking Lander, a robot camera operator that touched down on the surface of Mars in 1975, continued sending back photos of the Martian landscape until last year.

By 1967, the United States had captured the space race lead. That's when disaster struck. During a launch test at Cape Kennedy, an Apollo cabin caught fire and astronauts Gus Grissom, Ed White and Roger Chaffee were killed. Critics quickly called for NASA to hold back on the moon program.

But there were more supporters than detractors as NASA plunged ahead, and by July 19, 1969, Neil Armstrong and Buzz Aldrin were descending the steps of Grumman's Lunar Landing Module in the Sea of Tranquility. It was the famous "giant leap for mankind."

The Apollo program brought the massive Saturn rockets that would launch America's first generation of moonwalkers and space lab scientists. In May 1973, the NASA Skylab was sent into Earth orbit. Less than two weeks later, Pete Conrad, Joe Kerwin and Paul Wietz boarded the lab for nearly one month of experiments.

In July 1975, two rockets left the Earth and rendezvoused in orbit—one a Soviet Soyuz vehicle, the other an American Apollo craft. The docking marked the first major joint venture of any kind apart from the military alliance of World War II. But Apollo-Soyuz didn't end the space race.

The U.S. program has shifted its emphasis from planetary exploration to the Space Shuttle. By the end of the decade, NASA expects to have five Shuttle craft flying about 20 missions a year, lofting satellites and containers into space and performing space-walking repairs.

With each passing Shuttle mission, a new record is set: first Shuttle-



launched satellites this year, first American woman in space, the first program that permits any private citizen to place a package in orbit. (*Popular Mechanics* will send an experimental package up as early as 1985.)

The French Ariane rocket and a planned Soviet space shuttle have threatened to bite into NASA's "space truck" business. But, for the present, satellite and other space users seem to prefer the NASA version.

At the recent Paris Air Show, the Russians were offering to undercut the cost of a NASA Shuttle ride by 5 percent for any nation that wanted to switch to the Soviet model. So far as anyone knows, there were no takers, but the Soviets are reported continuing their shuttle building program. And the space race that started 25 years ago promises to continue for many years to come.

PM

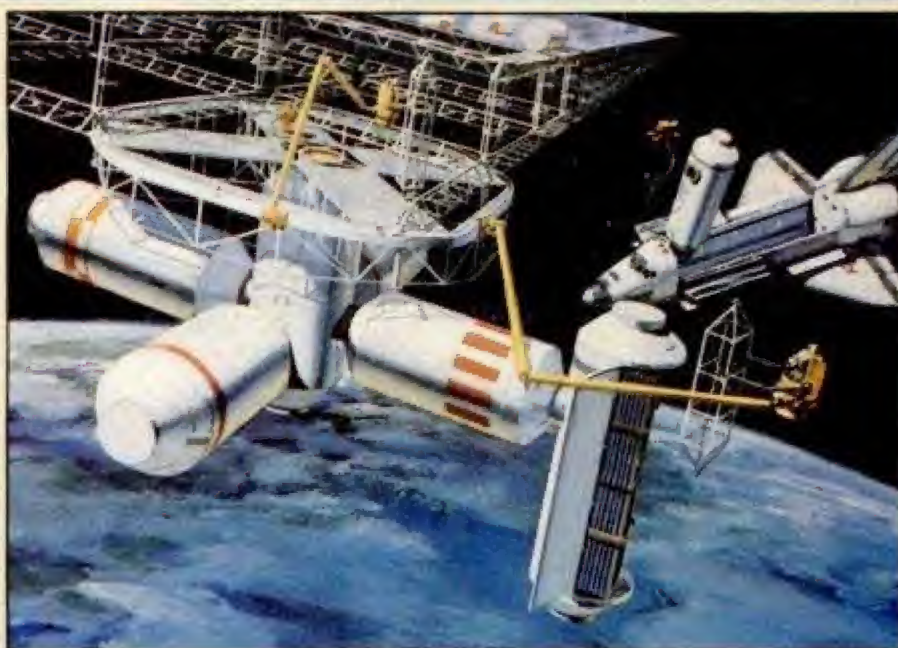
## NASA 2008: The Next Generation

BY JAMES BEGGS, NASA

In just one lifetime, we've watched unfold perhaps the greatest era of technological achievement in the history of the world. We've moved from horse-drawn vehicles to an aerospace shuttle and the exploration of the outer planets. Voyager II brought us the vision of primordial planetary development which was unknown just a few years ago. Along the way, the technological fallout—new materials, machines and techniques—became part of our everyday lives.

As we stand on the threshold of a new era in space, the Shuttle era, we may now plan activities undreamed of a few decades ago. The rest of the world is very envious of the fact that we have a mechanism in place and they're trying to duplicate it. Meanwhile, we can look 25 years down the road and ask where we are headed. We will try taking some quantum jumps in space. We can work with 65,000-pound payloads, inserting them into orbit, picking them up again, repairing them in the weightlessness of space. We can take massive cargoes back and forth between Earth and space stations.

The Shuttle has been flying commercial payloads since last November. It's ready for major jobs. I just reread some thoughts of a previous NASA administrator, Tom



Modular space station of the future will be built with parts hauled by the Shuttle.

Paine, who in the 1960s envisioned a shuttle-based space station.

By the year 2008, we'll have established a permanent space station orbiting the moon. Within the next decade after that, we could establish a small research colony on the moon. By 2030, a robot-driven enterprise—mining and manufacturing—could be in place on our moon base.

Aboard the Shuttle-based space station, we could establish modules for in-orbit research and earth-to-space communications. Such stations may well signal the beginning of interplanetary travel, and maybe even interplanetary colonization.

Beggs, the NASA administrator, has headed the U.S. space program since 1982.



# Camera Lenses

## THE LONG AND SHORT

Just look at what telephotos, zooms, macros and wide-angle lenses can add to your photography!

TEXT AND PHOTOGRAPHS BY ARMAND ENSANIAN

**M**ost single lens reflex (SLR) cameras are purchased with what is called a normal lens. "Normal" in photography means several things. First, the lens has an angle of view (how much it sees) similar to that of the sharp portion of our own vision, which is about 45° to 50°. Also, a normal lens sees objects in the same size relationship to one another as the eye. This makes it ideal for most photographic situations where an accurate representation of what one sees is needed.

Since the lens can be removed from the camera body with a snap or a twist, it's easy to change lenses. Op-



Zoom lenses can be used for many colorful effects, as the photo above shows.

**7-mm Fisheye**

**75 to 300-mm Zoom**

**75 to 205-mm Macro Zoom**





tional lenses are grouped in various categories, such as normal, wide-angle, telephoto, zoom and macro, and each is sold according to focal length. Focal length is the distance from the optical center of a lens to where the image appears to be in sharp focus if aimed at a subject at infinity. Just hold any magnifying glass in front of a piece of paper, aim it out the window and move it back and forth until the image on the paper looks sharp. Measuring the distance between the lens and the paper gives the approximate focal length of that lens.

Of course, modern camera lenses are complicated in design, often consisting of a dozen or more individual

lenses to correct for all sorts of optical distortion. But the idea behind focal length remains the same.

Most normal lenses for 35-mm cameras have a focal length of about 50 mm. Anything less than 40 mm is considered a wide-angle, or short lens. If it's over 80 mm, it's a telephoto, or long lens.

The wide-angle group probably contains the most interesting of the specialized lenses. Their shorter focal length focuses the image closer to the back of the lens. Focusing closer makes the subject image smaller, permitting more of it to occupy the same size film. Therefore, short-focal-length lenses have a wider angle of view as-

sociated with them. Another bonus is their greater depth of field.

The most popular wide-angle is the 28-mm lens. It has an angle of view of 75°, as compared to the 46° of a 50-mm lens. It's got plenty of coverage for most indoor photography and yet is great for scenic landscape shots.

It is the more extreme short-focal-length lenses that bring out the most interesting characteristic of such optics: the exaggerated foreground-background relationship. Because we are able to see more of the background with these lenses, they appear to greatly distort the size relationship between what's up close and the sub-



A 17-mm wide-angle shot (left) is contrasted with one taken with a normal 58-mm lens (right). Note how the wide-angle effect distorts the relationship of foreground and background size. By varying the position of the camera, many different special effects photographs can be taken of the same subject using the same lens. Because of this feature, short-focal-length lenses are among some of the most fun to experiment with.



Detailed close-up inside a pocket watch is the type of shot possible with a macro lens. This was taken with a macro adjusted to maximum extension for a 1:1 ratio. Images on film are the same size as the subject.

**135-mm  
Telephoto**

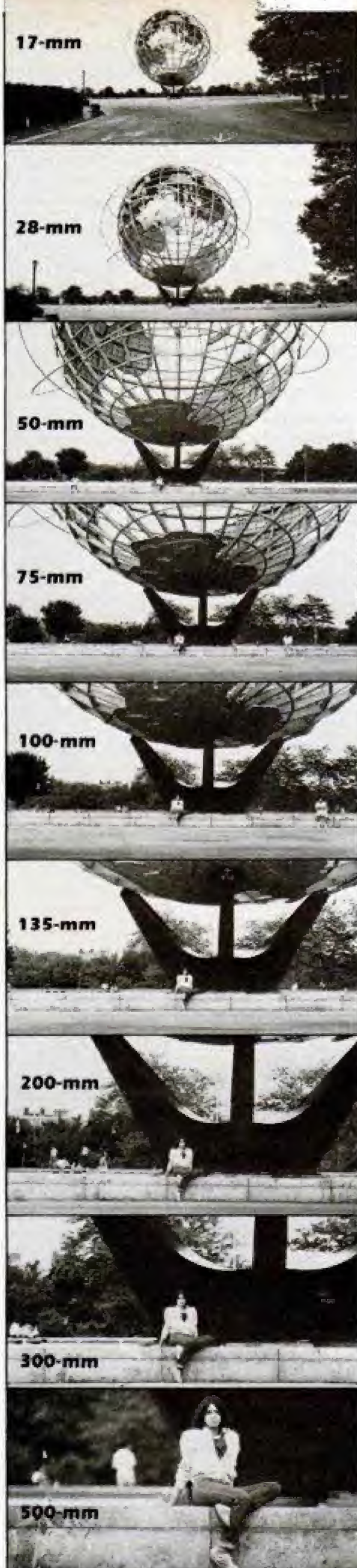


**70 to 210-mm Macro Zoom**

Our model holds just a few of the many lenses available for most SLR 35-mm cameras. All sorts of special effects can be achieved with the right lens. In this photo, notice how a 17-mm lens can exaggerate the relation between foreground and background. And even more distortion is possible, as shown in the close-up of the Corvette (right) taken with a 180° fisheye lens that was held 6 inches from the headlamps. The fisheye lens our model holds is made by Kenko; the other lenses are made by Vivitar.







ject farther behind. Actually, no major changes in perspective occur with focal-length changes. They only happen when the position of the camera is moved.

A fisheye lens, so called because of its appearance, combines this trait of exaggeration with a 180° angle of view and very severe barrel distortion—a condition which makes the subject appear to bulge outward. This produces the most radical wide-angle pictures, regardless of the subject. A close-up of Aunt Martha's face with this 7-mm lens would make her nose look like a canoe. The lens is primarily used in situations needing the most coverage in the least amount of space. Several manufacturers offer less expensive add-on fisheyes which screw onto the front of the normal lens. They cost a little less than \$100.

A more practical lens is the 17-mm wide-angle. These computer-designed lenses fill the entire frame with a 104° angle of view and are nearly free of the fisheye's curvilinear distortion. Its wide view makes it ideal for photographing in limited spaces, such as airplane cockpits, without obtaining the confusing circular image of a fisheye. The lens is also very useful for dramatizing specific portions of a subject, such as automobile fenders. Low to the ground sports photos also seem to be favorites of 17-mm users.

### Far brought near

Ask any SLR owner which is his or her second lens and the answer will probably be a telephoto. There is something exciting about being able to bring a subject closer. Maybe it's the peeping Tom instinct in all of us.

Telephoto lenses have a narrow angle of view and are longer in focal length. Being farther from the film allows the image coming through the lens to enlarge more. The most popular telephoto is the 135-mm with an 18° angle of view. It's a good lens for those across-the-street shots, but hardly compares to the power of a foot-long 300-mm.

Telephotos find their homes mostly with sports or wildlife photographers. Their narrow angle of view, 8° for a 300-mm, makes it difficult to follow subjects quickly. It's like looking through a paper tube. A steady hand or tripod is a must for keeping the image on the film sharp when using lenses that are 300 mm or longer.

Fixed-focal-length telephoto lenses have lost their popularity to another miracle of optical engineering, the

zoom. Zoom lenses are variable-focal-length lenses incorporating movable optics inside the lens barrel. The most popular zoom, 80-210 mm, has become a favorite of amateur photographers because of its versatility.

### Computer-designed zooms

Recently, smaller zooms have been designed with the help of computers. Many photographers have retired their normal lenses in favor of such convenient focal-length ranges as 28-85 mm or the less expensive 35-105 mm. Telephoto buffs can appreciate the great zoom range of a 75-300 mm lens. It's a good choice on a camping trip or a day at the ball game.

All of these lenses are inherently a bit less sharp than many of their fixed-focal-length counterparts, but unless you are into photographing lens test charts, the difference is of little consequence.

There is one special feature of a zoom that many photographers overlook—zooming during an exposure. Night scenes of lighted buildings and cars work best. Mount the camera on a tripod, focus at the longest focal length and set the shutter to a one-second exposure with 100 ASA film. Set the aperture to about f/11 and release the shutter. Zoom slowly while the shutter remains open. On automatic cameras, change the aperture to f/16 or f/22 if need be to get the slower shutter speeds. Practice without film first.

### Getting closer

SLR owners seldom stick with just one lens. The next logical choice is for a close-up or macro lens. Many zooms are called macro zooms, but are hardly suited for serious close-up photography. A true macro lens is designed to provide optimum performance at very close distances. These lenses have an expandable lens barrel which allows life-size (1:1) images on the film without the aid of other attachments. A typical macro zoom, for example, may have only a 1:4 reproduction ratio. Macro photography can easily become a hobby that can last a lifetime. It seems that almost anything viewed up close looks interesting.

The complicated task of choosing a lens can be simplified greatly by asking yourself what it is that you most enjoy photographing. But remember to first become familiar with your normal lens and its capabilities. A new lens—long or short—doesn't have built into it your own special way of seeing photographic subjects.

PM

The series of photographs at left were taken from the same position to illustrate how different lenses change the angle of view. Perspective and size relationships remain unchanged with the long-focal-length lenses. If you were using film with fine enough grain, much the same effect could be achieved by progressively enlarging the 17-mm photo. Telephotos, unlike wide-angles, do not introduce any distortion.



# DRESSED TO KILL

Today's football player needs two hours to get into the plastic, high-tech armor that could save life and limb.

BY DENNIS ESKOW SCIENCE EDITOR



Defensive end Joe Klecko (73) of the New York Jets rushes at Baltimore Colts tackle Leo Wisniewski en route to knocking down quarterback Art Schlichter (out of view). Klecko's high-tech armor includes a new composite bird cage face protector and reinforced shoes.

**T**he half-ton machine rolls down the open field, tearing up the turf beneath it and pushing aside virtually anything that stands in its way. To football fans, it's the New York Sack Exchange, a well-oiled squad of defensive football players famous for getting quarterbacks to sit down—the hard way—right in the middle of a game. The New York Jets' defensive line, like its counterparts at 27 other National Football League franchises, specializes in body contact at the most intense and destructive levels. A Stanford University study estimates

that when any two professional football players collide at top speed, they release enough energy to move a 33-ton object 1 inch.

"It could be worse," quips Joe Klecko, the 6-foot-3-inch, 269-pound Jet defensive end. "It could be 15 years ago." That was before the advent of synthetic materials like Plexon, closed-cell rubber and polyester-covered cushion foam. Back then, a football player carried up to 25 pounds of equipment. Today he wears about 12 pounds of protection. And the current gear does a far better job

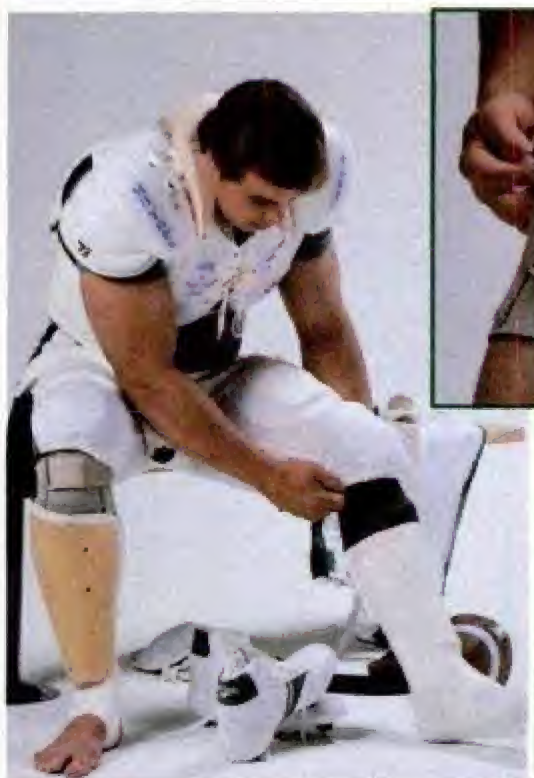




After applying yards of tape to his ankles, Joe Klecko, wearing a flak jacket, pulls on lightweight trousers (above). Shoulder pads fit snugly over the flak jacket (right). On bench are artificial-turf shoes and heavy-weight trousers. On floor (clockwise): knee pads, football, natural-grass shoes, cup, tear-away jersey and knee bands.







Flak jacket is cinched (top) with Velcro belt. A form-fit knee-to-ankle shin guard is strapped on (left). In detail photo above, Klecko hooks together springs that form a special shock absorber for knee. On average, more than 100 pro footballers undergo knee surgery each year.

PM photos: Bill Ashe

Klecko laces natural-turf shoes (top right) for games at Shea Stadium. His made-to-order Keds are high-top for ankle protection and have a metal-reinforced toe to protect his feet. He has similar shoes with extra cleats on the bottom for road games on artificial turf. The Jets' supersacker dons a thumb-knuckle protector (bottom right), one of 20 protective devices available for hands and feet.



of keeping football heroes out of hospitals. In the old days, players would collapse at half-time, suffocating from the heat and sweat beneath their armor. Nylon, urethane, vinyl and other lightweight materials have brought that to an end.

"We have a lot more to work with than we ever had before," says Jet trainer Bob Reese. In the Jet locker room he can point to several pieces of equipment developed out of special material for specific players. Sometimes the special pieces catch on and become standard gear. Sometimes they're destined to remain the hallmarks of a single player.

The best known specialized armor to catch on like wildfire was the flak jacket, first worn by Houston quarterback Dan Pastorini in 1978 to protect his broken ribs. The inflatable polyester and plastic vest invented by Byron Donzis was slipped on and laced up the front. Then it was inflated to fit snugly around the quarterback's ribs. Since Pastorini, most professional quarterbacks have worn a Donzis flak jacket at least once to protect bruised or broken ribs. Despite a price tag of \$310, the jacket is even worn by college and high school players.

Perhaps a bit more esoteric are the special shoes made by Pro Keds for Klecko. The shoes have a steel plate in the front of the sole to protect the hard-running defensive end's feet. The Klecko shoe is also a high-top instead of the more popular low-cut type to provide added support to his ankles, which have been injured in past seasons.

### The uniform as a weapon

Conrad Dobler, listed in the 1982 official Datsun Football Guidebook as "Mr. Violence," has been quoted as calling the pregame suiting-up "dressing to kill." Dobler, a former St. Louis Cardinal offensive lineman, is a veteran of the era when a uniform was part of a player's ammunition.

Up until 1979, defensive players often speared opponents, lunging into them helmet-first. The practice was banned in college ball in 1970 and has been outlawed by the pros since 1979, the year after Oakland defenseman Jack Tatum helmeted New England receiver Darryl Stingley, leaving Stingley permanently paralyzed.

Suiting up for a football game is one of the most time-consuming things a player has to do. "You give yourself a good two hours," Klecko says. "You want everything to go on just right. This stuff is protecting your butt."

The dressing ceremony has been compared to the preparations made



by a bullfighter. The player puts on his jockstrap, and he may also want to insert a cup to protect the genitals. Then a heavy elastic support for the back and abdomen is put on.

With the help of an assistant trainer, a plastic undercoat is sprayed on the skin and on goes the tape. The undercoat prevents itching and pain-

ful over-sticking. Up to 10 yards of tape are used to protect a player's ankles and wrists. For many players, the knees also have to be taped. The knee is the most often injured joint in pro football. Sports Medicine Associates of New York reports over 100 football players undergo some form of knee surgery each season. In 1980, the De-

troit Lions took on a dubious distinction when a record 21 players underwent knee surgery.

Many receivers and defensive backs also tape their forearms. It gives them a bit of stickiness to aid in catching or intercepting a pass. Players are not allowed to spray on any added stickum. Other players—guards and tackles in particular—tape their arms to make them somewhat rigid.

The taping exercise can take up to an hour, especially if the player wears elastic wraps or hand pads. Now the athlete is ready for the padding. Most players wear a set of knee-length nylon pants with snap-in thigh guards and knee insert pockets for the knee pads. The knee pads have been around for a long time, but many sprinting players of the past went without the protection rather than having the cumbersome pads flop around as they ran at top speed. Today's knee pads make it much easier. Made of half-inch-thick cushion foam with polyester backing, the new pads contract from body heat and form-fit the knee. Similar features are available in specialized shin guards.

Once the pants are cinched up, the player can put on his flak jacket and shoulder pads. The shoulder pads are the heaviest protective devices—up to 5½ pounds. They have to be cinched in tightly, and the banana flaps covering the shoulders must be pounded by the trainer or another player to make sure the pads are set perfectly in place. "That's the place where you get grabbed and shoved the most," Klecko notes. "You don't want the shoulder pads to slip at all."

Near the end of the dressing ritual, many players insert a leather neck-protector between the top of their shoulder pads and the skin of their neck. It makes the fit a bit uncomfortable, but any player who's been thrown down in the heat of combat will agree that the neck protection is vital.

In addition to the basics worn under his jersey, a player may have as many as 20 other local protective devices. There's the knee-cartilage shock absorber, which is a spring and hook device that fits onto the knee brace on the outside and helps lessen the shock to the knee from a sudden stop, as in a blind-side tackle. Soccer-type shin guards molded from the ankle to the base of the knee have become popular in the training rooms of the Jets and their New Jersey rivals, the Giants. The shin protectors were developed by Joe Rosenstein, former trainer of the New York Cosmos soccer team.

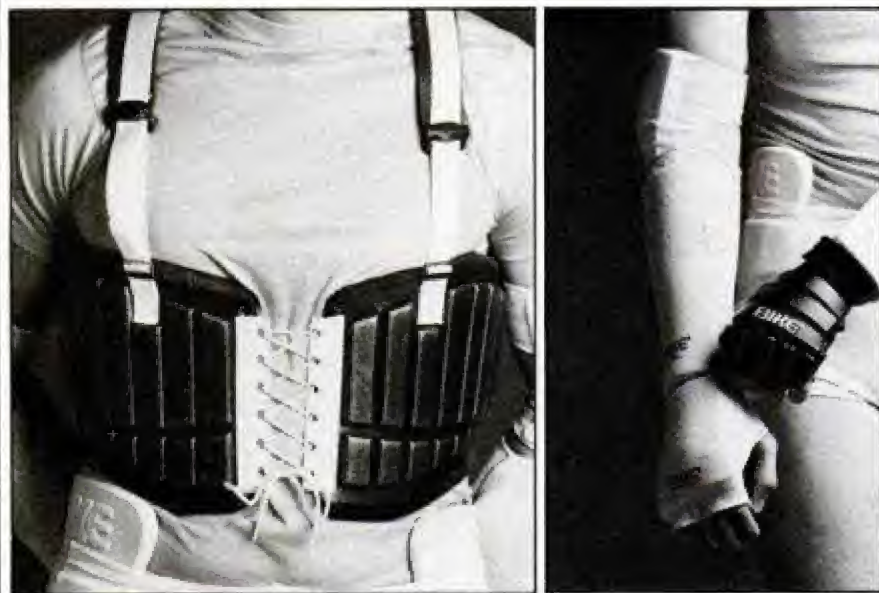
Elbow braces, biceps pads, wrist  
(Please turn to page 175)



Helmet cutaway shows foam pads and filled pods used to absorb head blows. Helmet's face guard is a "cowcatcher," which gives full-face protection. To its right are ultra-light, open-face guard and full-face "bird cage." Nose bumpers are in foreground.



Tough, lightweight body protectors made of plastics and composite include (left to right): knee guard with shock absorber (foreground), hip and thigh protector with spine support (foreground), hip guard with belt loops and contoured knee pad.



Composite flak jacket (left) hangs from shoulders by suspenders and is laced tight. This model protects a quarterback's rib cage. Forearm and elbow guard (right) keeps lineman's arm rigid, while wrist guards are kept rigid in an open-finger glove.





The amphibious fireboat's stern water cannon can pump an awesome 3,000 gallons per minute, while the bow guns put out 1,100 gpm each.

# Seafaring Fire Engine

**W**hen the bell rings at the firehouse of Miami's Special Tactics Team—less than a mile from the Miami River—a 13-ton machine lumbers out to the street just like a pumper truck. But the ungainly amphibian, 35 feet long, 10 feet wide and 11 feet high, draws stares as she rumbles along at a cool 35 mph.

GIs called them LARCS—those drab, round-bellied Light Amphibious Rescue Craft which braved 10-foot breakers to roll men and cargo on shore in Vietnam, and to patrol the Mekong River delta.

Now the old gray LARC just ain't what she used to be. Equipped with hoses and powerful pumps designed from NASA technology, the LARC has been transformed into a red and silver fire-quenching alligator that can eat



Miami's LARC fireboat marries a military hull to a NASA water pump.

It can take on any tough waterfront fire with its powerful space-age pump.

BY SOLANGE DE SANTIS

PM photos: Michael Delaney

fires just as easily on water as it does on land.

On land, the side visibility from the cramped cabin is poor, according to the firefighters who have operated the

amphibian. In fact, it's as tight as a space capsule inside the LARC's control center. However, shifting couldn't be smoother. An automatic transmission easily handles the two forward and two reverse gears of the four-wheel-drive vehicle.

At the river launch site, which need not be a paved boat ramp, since this tough craft can handle a 60° grade on sand or coral beaches, she simply rolls into the water. Once afloat, the power-assisted steering system uses stern-rudder and front wheels simultaneously. At a top pace of about 10 knots, the amphibian is slow but steady, and her ability to shoot water is truly awesome. The stern water cannon fires 3,000 gallons per minute (gpm); the two bow guns put out 1,100 gpm each. The large-

*(Please turn to page 160)*



# Copy-Cat Tape Decks

These new cassette decks feature two tape transports that let you copy tapes with ease and dub like a professional.

BY ARTHUR J. ZUCKERMAN

The arrow from the Realistic SCT-28 symbolizes the most popular use of all these dual-transport tape decks: One unit allows you to copy tapes as well as dub from one tape to another. The SCT-28 even copies tapes at high speed. The unit also has a continuous-play function. When the tape in the first bay finishes playing, the tape in the second bay starts automatically. Above the SCT-28 is Aiwa's entry, Model WX110. This deck not only copies at high speed, it can copy both sides of a cassette simultaneously, which means an entire C-90 cassette can be dubbed in 22½ minutes. The Aiwa unit also features extras, such as Dolby C.

The dual-transport tape deck, considered a novelty when it came out about two years ago, is capturing the fancy of music lovers. It gives you the ability to copy, or dub, a cassette without borrowing another deck and hooking it up to yours. One-machine copying is great if you've got a cassette player in your car, or use a cassette portable.

Dual-transport decks list for as little as \$200, and the top price for a model loaded with special features is only about \$450. Currently, they all have one major characteristic in common: One transport both records and plays tapes, and one only plays them. So, you can copy from one tape to the other, but you can't record on both simultaneously from an outside source.

A less universal but widely shared feature is high-speed dubbing. It permits decks to make copies in half the normal playing time or less, in addition to dubbing tapes at the standard cassette speed of 1½ inches per second (ips). Another common feature is continuous play. One cassette (usually the one in the play/record transport) starts playing when the other one stops.

We put six dual-cassette decks and one portable through their paces. The

AIWA WX110

REALISTIC SCT-28





decks were the Sanyo RD W50 (\$199.50), the Realistic SCT-28 (\$339.95), the Sansui D-99D (\$350), the Onkyo TA-W88 (\$380), the Aiwa WX110 (\$395) and the Cybernet DD701 (\$425); the portable was Sharp's RD-688AV (\$650).

### Sanyo RD W50

The modestly priced Sanyo is a no-nonsense, basic machine. It operates at only the standard speed, and it has no microphone inputs. Equalization and recording bias for normal (ferric oxide), chrome (chromium dioxide) or metal (metal-particle) tapes are set manually, as is the recording level for a line source such as an amplifier, receiver or recorder. But the recording level for tape dubbing is set automatically. Setting the deck for dubbing also automatically turns off its Dolby B noise-reduction system.

To copy a cassette, you load transport 1 with the tape to be dubbed and transport 2 with a blank tape, and you set the input-selector button to the "tape 1 to tape 2" position. Then you engage the pause controls for both tapes and set transport 1 in "play" mode and transport 2 in "record" mode. Release

the two pause controls simultaneously, and you're in business.

This no-frills Sanyo model does have a simple program-search system for transport 1. If you push in its rewind key while it's playing, the tape will wind back to the dead interval (which must last at least four seconds) between the beginning of the selection you were playing and the end of the one before it. It will then start playing the selection over again. Pushing the fast-forward key during "play" mode makes the tape advance to the null at the beginning of the next selection. Holding in the rewind or fast-forward key when the tape reaches a null will make the tape continue to the next selection.

### Realistic SCT-28

The Realistic deck copies tapes at either standard or high speed, and has more features. Equalization for the tape 1 (play-only) transport is set automatically, but equalization/bias settings for

the tape 2 (record/play) transport are made manually. There is a manual fine-adjust knob for setting the recording bias to match precisely the different kinds of normal tape.

Jacks for left- and right-channel microphones are provided. A single mike, if plugged into the left-channel jack, is fed to both channels. But a mike can't be mixed with any other source. Dubbing procedure is like the Sanyo's, except for the high-speed option. Tape search on the Realistic is also similar to Sanyo's.

This deck also has a continuous-play function that is actuated by pushing in the "play" buttons of both transports after the "continuous play" switch is set. Tape 1 starts, and when it ends, tape 2 starts automatically.

### Sansui D-99D

Sansui's dual-cassette offering provides only standard speed for dubbing. *(Please turn to page 170)*

Sansui's D-99D is one of the most automated units we sampled. It has two program-search systems. The tape transport on the left will search backward to the beginning of a song and play it again. The transport on the right is a more sophisticated searcher and will allow you to skip ahead up to nine selections. The RD W50 from Sanyo is a basic two-mouth tape deck. Many of its features, such as dubbing, tape copying and record-level metering, are now considered standard among these decks. The RD W50 is a good buy for beginners.

## SANSUI D-99D

PM photo: Bill Ashe





# Do Beautiful Work In Tight Places

**W**hether you're an enthusiastic weekend craftsman, a devoted hobbyist or a professional jeweler, owning a flexible-shaft miniature power tool is a pleasure.

The tool consists of a motor which drives a handpiece by means of a flexible shaft. An accessory is held by the

BY JOHN GAYNOR

PM color photo by Walter Jackson  
How-to photos by the author

handpiece and used for stock removal and finishing operations. But, for tackling intricate, highly detailed work, this simple tool is in a class all by itself.

The Foredom Electric Co. is the front-runner in the production of flexible-shaft miniature power tools. Foredom offers 10 motor models, wall-hung and bench-mounted styles, 16 handpieces and hundreds of accessories. The accessories include points, burs, brushes, buffs, cutters and abrasives

Here's a Foredom tool lineup to satisfy the needs of most hobbyists and craftsmen:

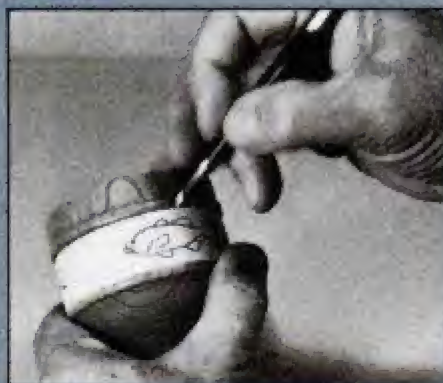
**1** Wall bracket; **2** R-series motor; **3** Assorted accessory kit No. 20; **4** Vanadium steel cutters kit No. 30; **5** Vanadium steel burs kit No. 100; **6** No. 30 handpiece; **7** Four collets; **8** Chuck key and retainer strap; **9** No. 55 handpiece; **10** No. 8 handpiece; **11** No. 448 handpiece; **12** Model SR-1 foot-operated speed control; **13** Sanding accessory kit No. 130.



## HOW TO CARVE THE GOBLET FISH



Wrap a paper strip around the goblet to find its circumference. Then sketch the design, spaced equally, onto the paper.



Place carbon paper under the pattern. Next, use a sharp pencil to trace the design, transferring it onto the goblet.



Use a small vanadium steel cutter in a No. 30 handpiece to carve out and smooth the background of design to a depth of 1/4 in.



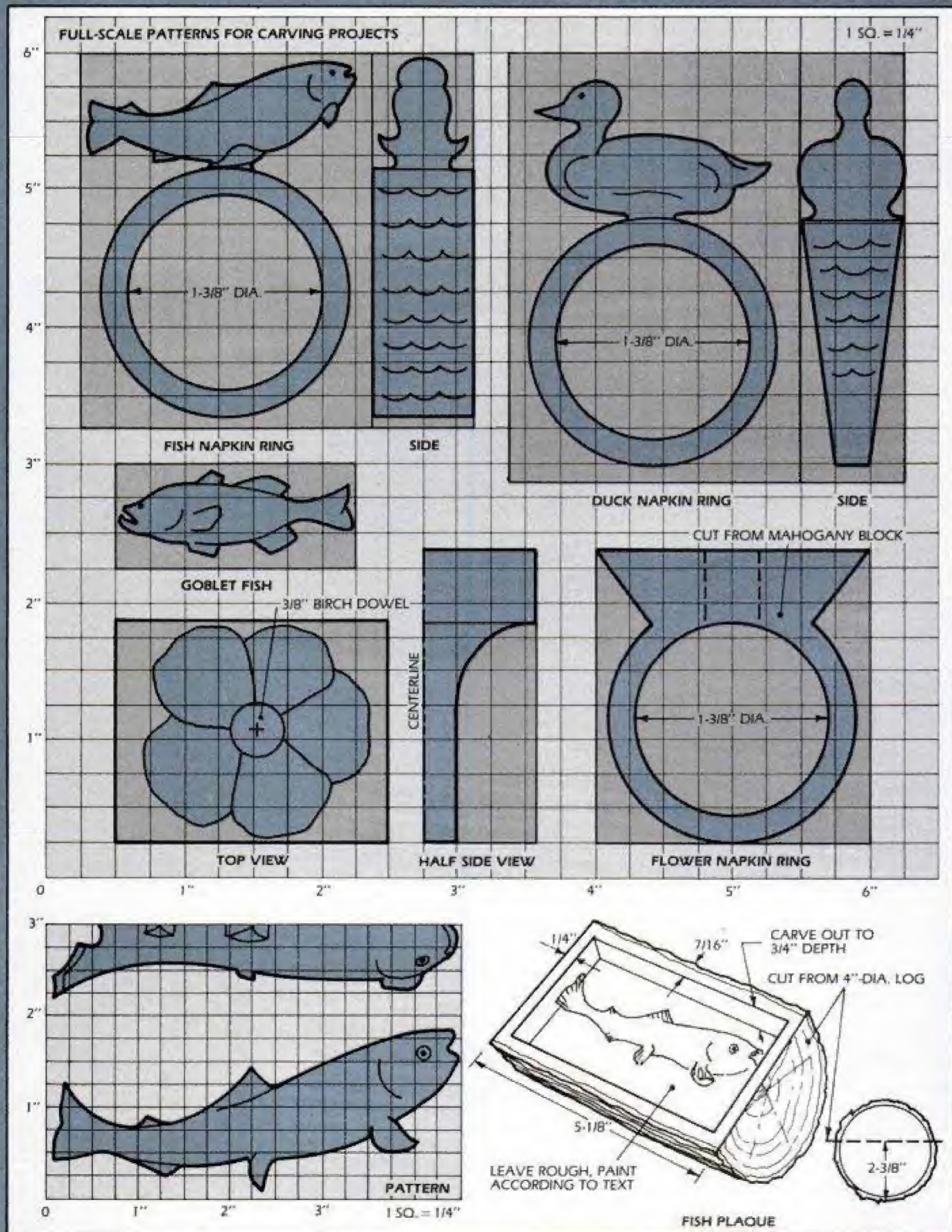




for use with almost any material. By joining the appropriate handpiece with the desired accessory, you can grind, carve, drill, sand, deburr, engrave, polish, rout and brush with ease, speed and precision.

The machine shown is the Foredom Model R-30 (a series R motor with a No. 30 handpiece). The R-30 is a  $\frac{1}{10}$ -hp, wall-hung motor with a maximum speed rating of 14,000 rpm. The speed is controlled by a No. SR-1 foot-operat-

ed, variable-speed control. Manually operated controls are also available. **Caution:** Never operate any accessory above its maximum rated speed. And always wear eye protection whenever you're operating any power tool.







For fine detailing, switch to a No. 55 hand-piece that is fitted with a steel bur. Use abrasive points to polish the rough spots.

Four of the 16 handpieces offered by Foredom were used to produce the projects shown. The first handpiece chosen was the No. 30 (\$48), a good all-around handpiece with a geared chuck. Next was the No. 44B (\$37), which is similar to the No. 30 except that it has a collet-type chuck for larger accessories. For lightweight, in-close work, the No. 8 handpiece (\$31) was used. Prelubricated ball bearings allow the No. 8 to operate at high speeds without overheating. The angled No. 55 handpiece (\$99)—an adaptation of a dental instrument—is designed for intricate, delicate work.

### Let unit do work

Before starting any projects, read the owner's manual thoroughly. Then practice getting the feel of the tool on scrap wood.

Be certain that you don't force the tool. Let the speed of the unit do the work. Generally, slower speeds are used for rougher, heavier work or when you feel that greater control over the accessory is required. Higher speeds are used for buffing, polishing and cutting.

Always disconnect the power cord before changing accessories. Inspect

(Please turn to page 174)

## Two Flexible-Shaft Tool Accessories That You Can Make

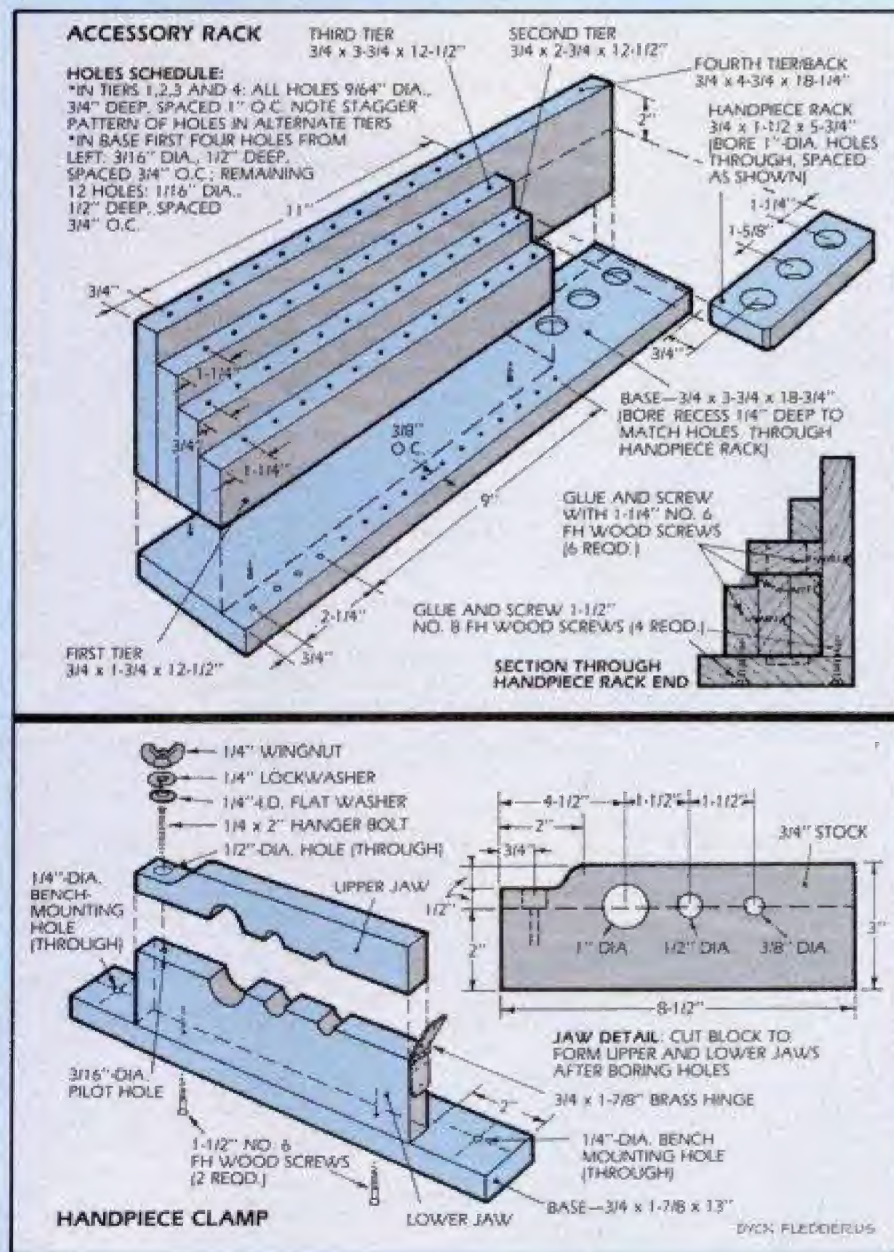
**T**he accessory rack evolved during the 40 years the author has worked with flexible-shaft tools.

The rack holds 62 accessories and three handpieces for quick selection and neat storage. Solid walnut was used for this

rack, but any other hardwood could be used as well. The surface is protected with three coats of clear finish.

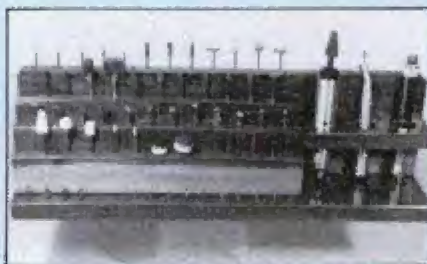
First, cut all the pieces as shown. Be sure to bore the holes before assembly (see the holes schedule in the drawing).

Next, glue and screw the four tiers together. Then, screw the tiers to the base using four 1½-in. No. 8 fh screws. Finally, attach the handpiece rack to the fourth tier with two 1¼-in. No. 6 fh screws. Hole diameters in the handpiece rack may have to be altered to accommodate certain handpieces.

**Handpiece clamp**

This simple walnut clamp serves as your third hand when using a flexible-shaft tool. Fasten the clamp to a workbench using screws or C-clamps. Then, place the handpiece between the jaws in the appropriate hole. Close the jaws and tighten the wingnut to securely grip the handpiece. This allows you two-handed control of the workpiece, which is helpful for polishing, buffing and brushing.

First, cut the piece that forms the clamping jaws. Bore the three holes, as shown, before ripping the block to form the upper and lower jaws. Certain handpieces may require different diameter holes. Next, join the two jaws with a brass hinge. Bore a hole to install the hanger bolt and wingnut. Then glue and screw the jaws to the base. Apply three coats of clear finish.



The rack provides neat storage and quick selection of accessories and handpieces.



When two hands are needed to hold the work, the handpiece clamp is helpful.



PM Reproductions

# A Classic Lap Desk You Can Build



With few variations, this lap desk is reproduced from the one Mark Twain used. The original desk is among the best in quality of workmanship seen in antique shops and museums today. Changes from the original piece incorporated into the copy include the brass corners of the lid (ones similar to the original weren't available), the size of the box and the material in the top. The copy is 3/4 in. deeper front to back to store 8 1/2-in.-wide paper. Mahogany plywood is used in the top. However, if 10-in.-wide solid mahogany as in the original is readily available, you can plane it to 1/4 in. thickness. Compartments provide storage for supplies.





This is a reproduction of the desk that Mark Twain used. You can build one in two weekend sessions.

BY RALPH WILKES

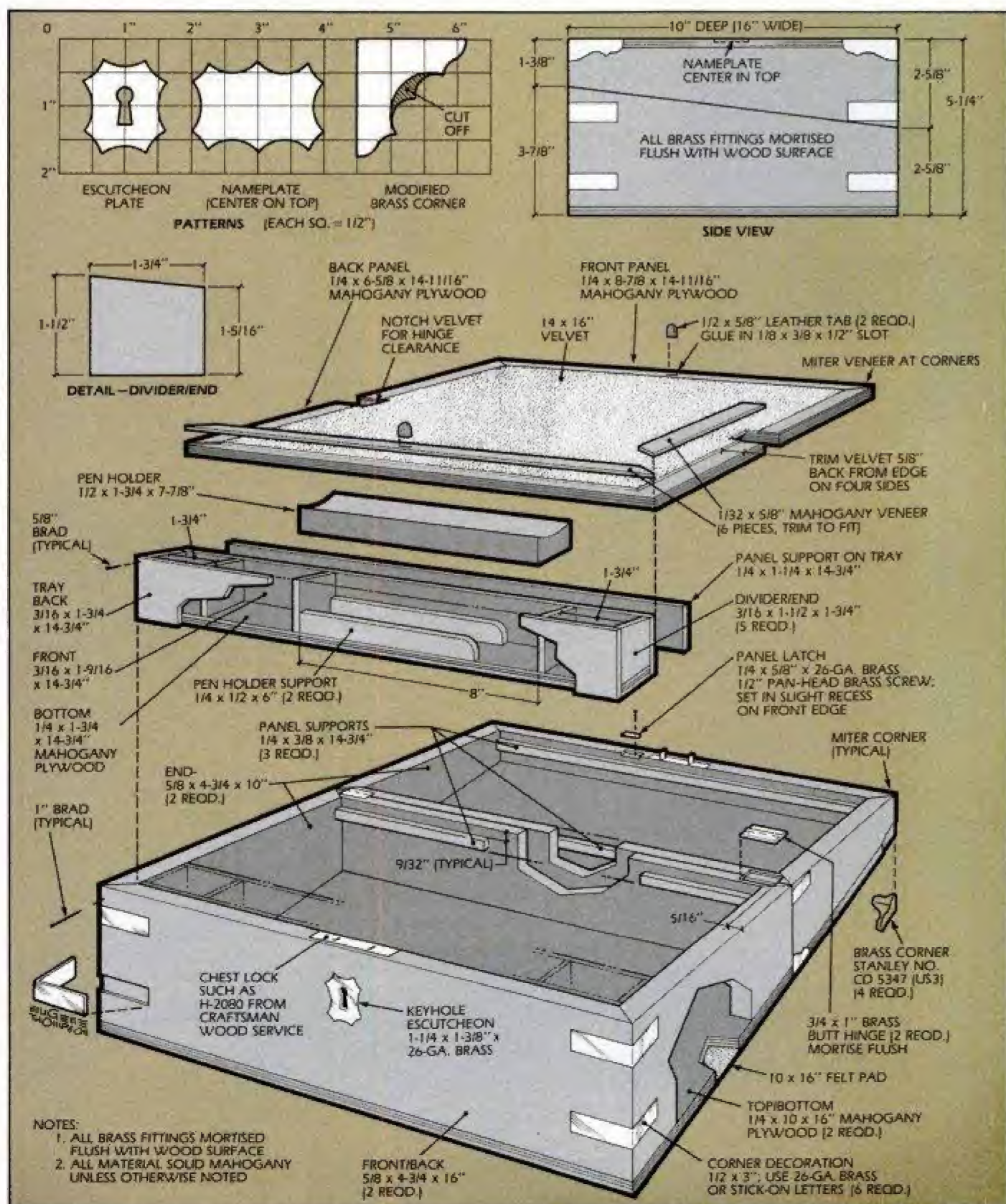
PM photos: Color by Walter Jackson;  
black and white by the author

This mahogany lap desk is a close reproduction of Mark Twain's desk, now in his collection at Elmira College, Elmira, N.Y. As I handled and measured the original, I thought how significant a role this little piece of furniture must have played in Twain's daily life. Perhaps on this velvet panel he wrote *The Adventures of Tom Sawyer*. The compartments may have held the notes for *Life On The Mississippi*.

Today, a lap desk is still a convenient box to store the essentials for writing. When opened, the slanted, velvet-covered panels provide a handy writing surface.

The corners of the lap desk are mitered so they show no end grain. Glue and nail the front, back and ends; then add the top and bottom. Be careful to locate corner nails where they won't

(Please turn to page 166)



NOTES:

1. ALL BRASS FITTINGS MORTISED FLUSH WITH WOOD SURFACE
2. ALL MATERIAL SOLID MAHOGANY UNLESS OTHERWISE NOTED



# 12 Tools That'll

What tools would an active homeowner or woodworking enthusiast select if he were turned loose in a well-stocked hardware store? We asked PM's home and shop editors that question and came up with the 12 tools shown. The favorites, we quickly discovered, either performed a specialized task, like cutting glass disks or trimming miters perfectly, or performed an ordinary task particularly well, such as smoothing wood or boring tapered screw holes. On these pages you'll find our editors' picks. We think you'll agree they are worth adding to your basic tool collection.

MITER TRIMMER



CIRCLE GLASS CUTTER

HOLD-DOWN CLAMP

JAPANESE SAW RASP

SPOKE SHAVE

CABINET SCRAPERS

BRAD DRIVER

TAPERED BITS

BRAD PUSHER

BLOCK PLANE

HOLE CUTTER

FENCEMAN'S TOOL





# Surprise You

## PICTURE-FRAMING TOOLS



**1** After you make a cut with a saw and miterbox, the massive hollow ground blades of this miter trimmer cut like a razor to produce an accurate finish cut that is glass smooth and requires no sanding. A left and a right gauge lock into any angle you desire from 45° to 90° to guide an angled cut. You can use the trimmer on stock up to 4 in. wide when mitering. You can also use it to square ends on stock up to 6 in. wide. The miter trimmer sells for \$209.95 postpaid and is available from Woodcraft.



**2** The circle glass cutter cuts up to 10½-in.-dia. disks for picture frames, mirrors, clocks and flashlights. Hold the rubber pivot firmly in the center of the glass and rotate the cutter head in a circle. Next, adjust the cutter head for straight cuts and make tangential cuts from the circle to the edge of the glass. Break off the pieces formed and you have a perfect glass disk. The cutter, which costs \$11.40 postpaid from Brookstone, comes with three spare cutting wheels and a screwdriver.

## WOODWORKING TOOLS



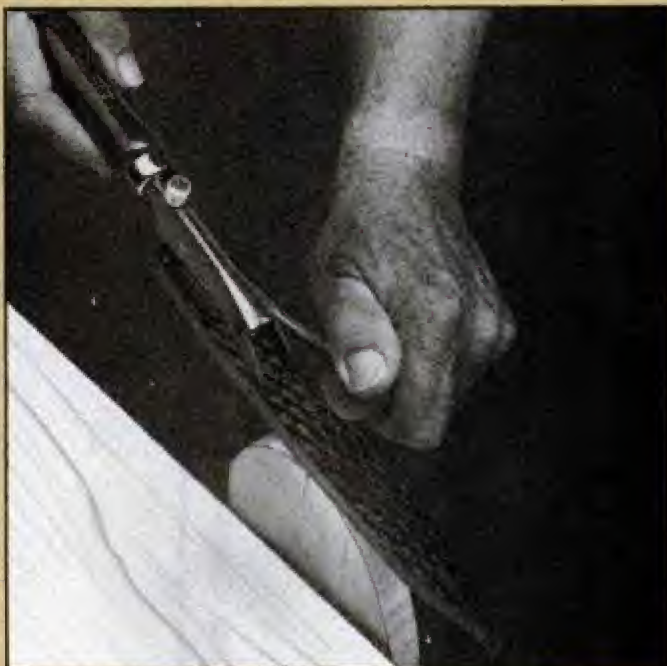
**3** This lever-assisted brad pusher makes setting the smallest brads a fast, simple and accurate task. You can drive brads without bending them, damaging your fingers or marring the workpiece. It's especially handy for setting the small brads that hold the backing in a picture frame. One jaw padded with rubber protects the frame while the other jaw presses in the brad. The pusher works on molding up to 1½ in. deep × 3½ in. wide. It's priced at approximately \$18 from Constantine.



**4** This superb small plane by E.C. Emmerich, West Germany, is available for the first time in the United States. For the same price you'd expect to pay for a first-rate steel plane, you can now enjoy the feel of working with an all-wood one. Its 2½ × 5½-in. body is crafted of varnished-steamed beech and the bottom plate is of hornbeam. Surprisingly, the block plane features a depth adjustment knob—no more tapping the blade to depth with a hammer. It's \$33 postpaid from Hammermark Associates.



## WOODWORKING TOOLS (Continued)



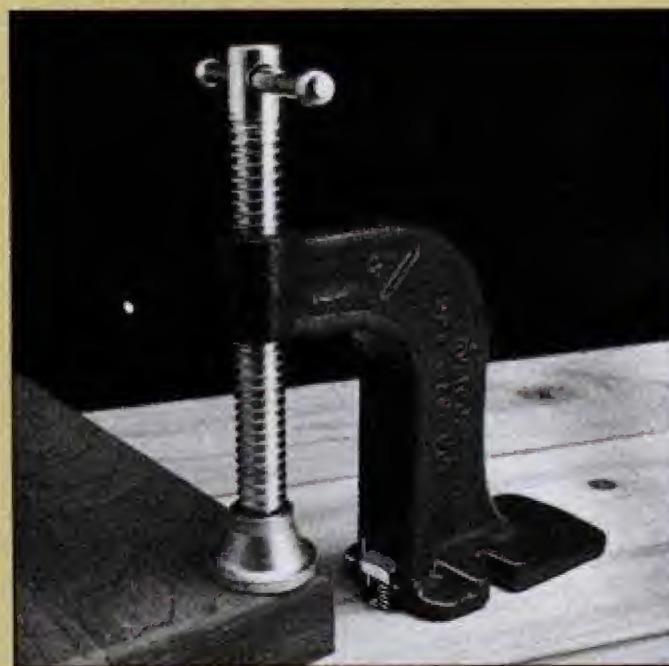
**5** This Japanese saw rasp planes and shapes wood smoothly and quickly without clogging. It is comprised of 10 two-sided hacksaw blades assembled so that the fine teeth are on one side of the rasp and the coarse teeth are on the other. The overall cutting surface is  $1\frac{1}{4} \times 10\frac{1}{4}$  in. To change sides for use, loosen the knurled nut on top and reposition the handle. The round knob gives you an extra hold for two-handed leverage. The saw rasp costs \$16.50 postpaid from The Woodworkers' Store.



**6** This round-face spokeshave works like a plane to smooth concave surfaces. Adjusting screws allow setting for thickness of shaving and provide lateral positioning. Normally, you would set the blade almost flush with the sole. Work with the grain to prevent tearing the wood on curves. The round-face spokeshave costs \$13.75 postpaid from Garrett Wade Co. A flat-face spokeshave which helps to chamfer or bevel edges and smooths flat surfaces is also available from the company.



**7** With this set of cabinet scrapers, you'll be able to smooth hollows and convex shapes as well as flat surfaces—nearly every shape you'll encounter in the workshop. The set includes a gooseneck  $2\frac{1}{4} \times 4\frac{1}{4}$  in., a round-end  $2 \times 5\frac{1}{4}$  in. and a straight scraper  $2\frac{1}{4} \times 5\frac{1}{4}$  in. Besides scraping paper-thin shavings to smooth wood, you can remove paint and fillers in hard-to-reach parts of moldings and in other irregular surfaces. The set is \$9.95 postpaid from The Woodworkers' Store.



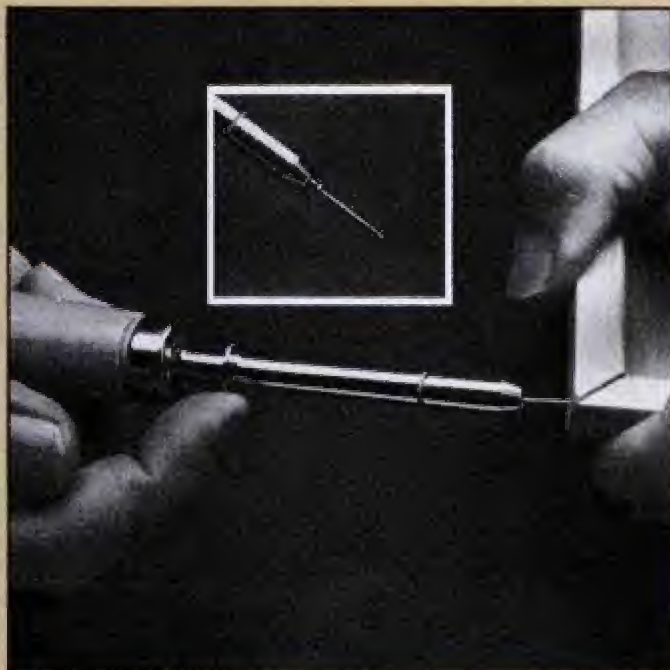
**8** You can install this handy hold-down clamp anywhere on your bench by simply boring and counterboring a hole and installing a hold-down bolt. The clamp slides onto the bolt head ready to secure work that's up to 3 in. thick. The clamp rotates  $360^\circ$  around the holding bolt to secure work at the right spot or easiest angle for the hobbyist. When it's no longer needed, remove the clamp and let the hold-down bolt drop down out of the way. The hold-down clamp is \$11.95 from Leichtung.

### SUPPLIERS

Brookstone Co., Dept. PM, 695 Vose Farm Rd., Peterborough, N.H. 03458.  
Constantine and Son Inc., 2050 Eastchester Rd., Bronx, N.Y. 10461.  
Garrett Wade Co., 161 Ave. of the Americas, New York, N.Y. 10013.

Hammermark Associates, Box 201, Floral Park, N.Y. 11002.  
Hyde Tools, Southbridge, Mass. 01550; attn.: Marketing Dept.; send only certified check or money order.  
Leichtung Inc., 4844 Commerce Parkway, Cleveland, Ohio 44128; 1-800-





**9** The wood-handled brad driver has a magnetic barrel that picks up a brad (inset photo), drives and sets it. The tool drives up to 1-in., 16- to 19-ga. brads. It is invaluable for panelling jobs, where one hand holds the panel while the other picks up and secures the brad. It's also handy when constructing picture frames, fastening window screen, applying decorative molding and working on miniatures and models. You can find many other uses. The brad driver is \$10 postpaid from Hyde Tools.



**10** At last, there's a tapered bit for boring holes that conform to the shape of a screw. Each bit comes with a matched, fitted stop collar and countersink/counterbore. In one operation you can prepare the wood for the threads, the screwhead and a wood plug. A setscrew, adjusted with the included Allen wrench, secures the stop collar in position to counterbore for a plug or countersink for a screwhead. A set of seven bits for screw sizes Nos. 5 through 12 is \$59.25 postpaid from Garrett Wade Co.

## HOME IMPROVEMENT AND MAINTENANCE TOOLS



**11** Finally, there's a hole cutter claimed by its maker to work in a portable electric drill—and, by golly, it does. The cutter removes disks from 1½ to 18 in. in diameter in wood, plastic and soft metals. You can make portholes and speaker or basin cutouts in wood or plastic laminate, to name a few uses. Push the free end clockwise to achieve a clean hole (cutout); push it counterclockwise to cut a clean disk. Cutter costs about \$32, including a steel case, a bit and an Allen wrench from Constantine.



**12** You'll find countless uses for this multipurpose fenceman's tool. For starters, it stretches and twists wire, pulls and drives staples, and cuts heavy-gauge wire. In other words, you can use it as a plier, a wrench and a hammer. The handles of the 10½-in.-long tool are clad in soft vinyl to give you a comfortable grip. The driver weighs a hefty 21 oz. and is made of high-tensile-strength alloy steel hot drop forged. The fenceman's tool is \$16.40 postpaid from Brookstone Co. **PM**

321-8840; additional \$3.50 handling is required on items up to \$25. Woodcraft Supply Corp., Box 4000, Woburn, Mass. 01888. The Woodworkers' Store, 2180 Industrial Blvd., Rogers, Minn. 55374; additional \$1.50 handling charge per order.

## CREDITS

Tool consultant and photo direction: John Gaynor  
Color photos: page 102, Bill Ashe; other color and black and white photos: Chuck Rogers, except block plane photo: Harry Wicks  
Wood surfaces: Constantine; preparation: Rosario Capotosto



# DETROIT '84



AMC/Renault Encore



Jeep Cherokee



More versatile and a little more luxurious than the Alliance, the Encore (top) takes AMC upscale. Four-door Cherokee (left) can be rugged and luxe. New XJ (right) is at home off-road and on. XJ interior (above) is well designed and attractive.

## AMC's DOUBLE THRUST ALL-NEW JEEP AND RENAULT ENCORE

A new addition to its passenger cars and a whole new line of Jeeps put AMC right back into it.

BY DANIEL CHARLES ROSS DETROIT AUTO EDITOR AND RAY HILL OUTDOORS EDITOR





PM photo: Vic Huber

**A**merican Motors/Renault scored decisively last year with the introduction of the Renault Alliance. Anyone who awarded "car of the year" laurels in 1983 gave them to the Alliance, aptly named for the cooperation between French Renault, which supplied the European R9 basic architecture, and AMC, which adapted and is building the little car at its highly robotized Kenosha, Wis., assembly plant.

But the car which was to follow Alliance to this country from France had to attempt to duplicate the predecessor vehicle's success, with an appropriate new name AMC/Renault hopes will appeal to a slightly different buyer. Of course, there was but one truly suitable name for the new car. Encore.

The Encore is exactly that—a curtain call for a top performer who's had the opportunity for a costume change. The Encore is a bubble-back, three- or five-

door hatchback which AMC/Renault insists boasts "sporty cues," intended to appeal to a more sporty-oriented buyer audience than does Alliance.

The Encore is just what it appears to be: It's a hatchback version of the Alliance, a conclusion unmistakable from all angles of examination. While AMC/Renault insists the car is more appealing to the younger, "upscale" audience marketers all seem to covet, we think it will still appeal to the people who enjoyed the Alliance—since it's virtually the same automobile.

Encore has the same rack-and-pinion steering as Alliance, at 3.2 turns lock to lock for the power-assisted version and four turns for manual. Both cars have identical chassis, with a 97.8-in. wheelbase and overall width of 65 in., though the Encore shows up

*(Please turn to page 158)*



**DETROIT**  
**'84**



**Mustang SVO**

# **FoMoCo**

## **IS PACKAGING GET-UP-AND-GO!**

Under the slippery sheet metal of Ford Motor Company's new models are neat tweaks for higher torque.

---

BY DANIEL CHARLES ROSS DETROIT AUTO EDITOR

---





**Mustang GT**



**Mercury Cougar XR-7**



**Ford EXP Turbo**



The ultimate Mustang, the SVO, sits on the line ready to go head to head with the GT version. A driver's eye view of Mustang instruments and controls, including the leather-wrapped steering wheel, is seen above. Mercury's Cougar, sibling of Ford's T-Bird, mounts the 2.3-liter, fuel-injected turbo Four (above), while offering either five-speed manual or automatic transmission. Ford's EXP Turbo puts the blower on a 1.6-liter Four that's good for 110 hp at 5,000 rpm and 120 ft.-lb. of torque at 4,000 rpm.

**F**rom screaming turbochargers to four-shock rear suspensions to ultrasleek new aerodynamic luxury tourers, Ford has had fun designing its '84s.

Just look at the new Mustang SVO. There's no mistaking this car for the Mustang GT, not in appearance or performance. The SVO is from Ford's Special Vehicle Operations group. SVO had primary responsibility for its version of the Mustang. Its performance, therefore, is what could be expected from the section of Ford which also goes out to the races in IMSA GTP Mustangs.

The Mustang SVO is powered by Ford's 2.3-liter, air-to-air intercooled Four, turbocharged to a blistering 176 hp at 4,400 rpm. A hefty 210 ft.-lb. of torque spools up at 3,000 rpm, making the Mustang SVO a very willing, high-revving and

quick-stepping car. The power is well put to the street through Ford's use of the Borg-Warner five-speed transmission, providing gear ranges calculated to get maximum use of the available power under most circumstances.

The output of the turbo 2.3 and intercooler is remarkable. Last year's 5.0-liter eight-cylinder powerplant showed up with 175 hp at 4,000 rpm. The blown four-banger does feature a "big engine" feel, though it isn't nearly as effective in the power-on department *right now* as this year's Mustang GT V8.

In the looks end of it, the SVO Mustang is not like anything you've ever seen in an American car. Its nose is virtually grilleless, in an obvious but welcome nod to better airflow over the car. Aerody-

(Please turn to page 164)



**DETROIT**  
**'84**



# **GENERAL MOTORS** **LAYS ON THE LUXURY**

The General is writing take-out orders for more convertibles, Eurosport models and station wagons with the works.

---

BY GARY WITZENBURG

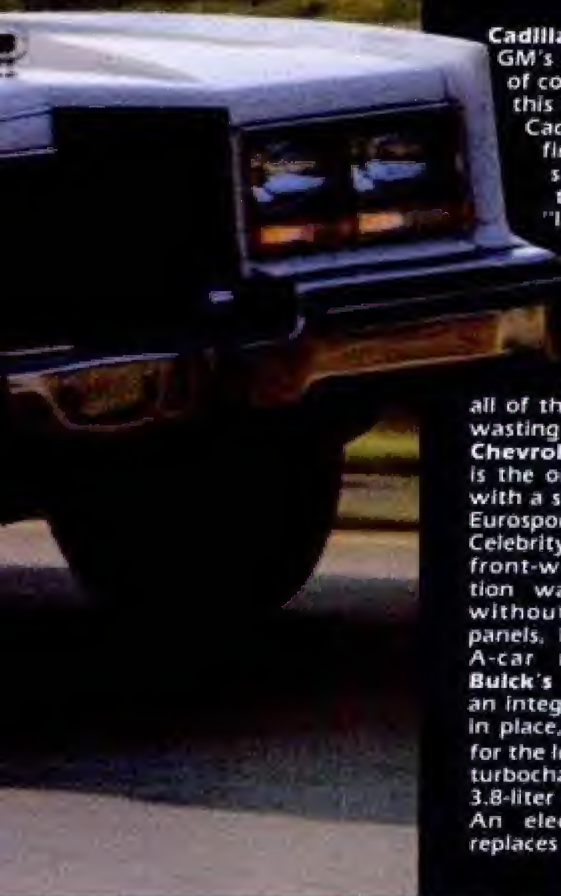
---



**Hurst Olds**



**Cadillac Eldorado**



Cadillac Eldorado joins GM's growing number of convertible models this fall. The soft-top Caddy for '84 is the first one produced since 1976, when the firm made its "last" convertible.

Oldsmobile's rubber-burner is the Hurst shifter setup that enables you to go quickly through all of the gears without wasting any time. At Chevrolet, matte black is the order of the day, with a showroom full of Eurosport models for the Celebrity line. And new front-wheel-drive station wagons, with or without woody side panels, have joined the A-car model lineup: Buick's Century, with an integral luggage rack in place, is ready to roll for the long haul. Buick's turbocharged engine is a 3.8-liter V6 with 200 hp. An electronic module replaces the distributor.

**Chevrolet Celebrity**



**Buick Century**



PM photos: Vic Huber

**W**ith gas plentiful and still fairly cheap, bigger cars selling like nickel beer and some smaller ones going begging, the underlying theme at GM once again is "give 'em more luxury."

Softer ride, more sophisticated stereo and electronics, gadgets and gimmicks, more vinyl roofs and wire wheel covers, more everything. You'd think there had never been a fuel shortage, let alone two in the last decade. And so long as peoples' memories are that short, General Motors aims to be there to help them forget.

When we journeyed to Detroit and endured five hot, muggy days of GM's '84-model previews to find out exactly what was up, we thought it was going to be a pretty dull session—especially since GM made the decision to delay introduction of the corporation's all-new fwd G-body luxury cars (Cadillac DeVille, Buick Electra, Olds 98) until after the first of the year.

What we found, though, was interesting, occasionally

exciting and highly revealing of how each division sees itself and where it's going as the long-awaited auto sales recovery gains momentum.

You've seen Pontiac Div.'s lovely little two-seat Fiero (*Detroit '84*, page 68, Sept. '83) and now Cadillac's up with a new Eldorado convertible. New wagon versions of the excellent fwd A-cars (Chevrolet Celebrity, Pontiac 6000, Olds Cutlass Ciera and Buick Century) replace the old rear-drive G-body (Malibu, Bonneville, Cutlass, Regal) wagons and feature nearly three cubic feet more cargo room.

There are the usual "bold new grilles," minor styling and trim changes and upgraded features.

But there are substantive improvements as well: new GM-spec, all-weather radial tires (standard or available on most models) that offer far better mud, snow and wet-weather traction with the added benefits of lower rolling resistance and noise; a new cruise control sys-



# DETROIT '84



Pontiac 2000



Pontiac  
Trans Am



Cadillac  
Cimarron



Chevrolet  
Celebrity

Pontiac 2000 In its Turbo FI configuration, shown here, is a 150-hp screamer. The 1.8-liter, overhead-cam Four with turbo-charging and port fuel injection gets a big lift over its 82-hp output in stock form. The turbo on the 1.8-liter engine, like that on the Buick V6, is from Garrett AiResearch. Boost is limited to 9.4 p.s.i. on the Pontiac. Trans Am is seen in its birth-day suit—diaper white with special wheels—for its 15th year as one of America's most coveted nameplates. The Chevy Celebrity wagon shown here is one of GM's Eurosport versions that's sure to create a stir in the showrooms this month. Cadillac Cimarron takes on a very smart appearance with its new grille and revised taillamps for '84.

tem with "resume" as well as "tap-up" and "tap-down" features to let you fine-tune your speed in one-mpg increments; and ride, handling and engineering improvements.

Cadillac kicked off the proceedings with introduction of its plush new Eldorado convertible.

You may recall that "The Last American Convertible" was supposed to be the '76 soft-top Eldo, which quickly became a collector's item. Some 14,000 were sold, compared to 8,950 the year before. It was left to Chrysler to boldly resurrect the soft-top two seasons ago. Buick and Ford followed with ragtop Rivi-

eras and Mustangs, and both Chevy and Pontiac currently offer open-air J-cars.

Now the Eldo convertible is back. It's an American Sunroof Corp. conversion of the topline Biarritz. It comes in white, blue and Autumn Maple Firemist (red) with a white top; features a full cloth headliner, a glass rear window, power rear quarter windows that raise and lower automatically with the top, and extensive frame and body reinforcements. It will be (of course) *very expensive*—probably about \$30,000. Cadillac expects to sell 2,000 to 4,000 of them a year.

Interestingly, there's also a *fake* convertible top

(Please turn to page 177)



# Economaster<sup>®</sup> BRAND No Previous Owners

## Holley



**Holley  
Makes Fuel Efficient**

When you bolt on an *Economaster*<sup>®</sup> brand carburetor from Holley,<sup>®</sup> you bolt on the best value for your dollar. New carburetor efficiency and proven reliability. And that's something you can't always say about a "hope-for-the-best" rebuilt.

An *Economaster* carburetor costs much less than many original equipment replacement carburetors, too. Yet it delivers improved performance and driveability in

spades. Many models can also restore your original fuel economy — sometimes even surpass it!\*

And *Economaster* carbs are designed for easy installation.

Remember: *Economaster* carbs have had no previous owners — and that means no little performance surprises. Not a bad reason for you to always specify a fresh-from-the-factory *Economaster* carburetor for your engine. Holley Replacement Parts Division, 11955 E. Nine Mile Road, Warren, Michigan 48090.

\* Actual fuel economy may vary due to application, engine and driving conditions, engine modifications and driving habits.

\* Registered Trademark

## Holley

Replacement Parts Division

Colt Industries





## LOOKING UNDER THE HOOD

# JEEP POWER FOR AMC

**T**he new American Motors Eagle-Jeep 2.5-liter four-cylinder was developed by cutting down a larger engine, the old 4.2-liter Six. However, you don't just lop off cylinders at the front or rear of a block, put in a new crank and cam and presto—have an instant, new, small, fuel-efficient engine.

What AMC did to engineer its Four is a good example of how the cut-down process really works.

### A brand-new engine

AMC actually designed a brand-new engine, just taking care to locate cylinder bores and other holes so it could use six-cylinder tooling already in place.

The boring machinery, for example, is rigidly mounted and there's no way to change spacing. So AMC kept the same spacing between cylinder bore centers for its Four, but changed the boring bit to increase cylinder diameter from 95.3 to 98.4 mm. It also kept the fuel pump in the same place relative to cylinder No. 1, distributor and oil filter relative to No. 3, and starter relative to Nos. 5 and 6. Block-machining tools for those parts, therefore, can also be reused.

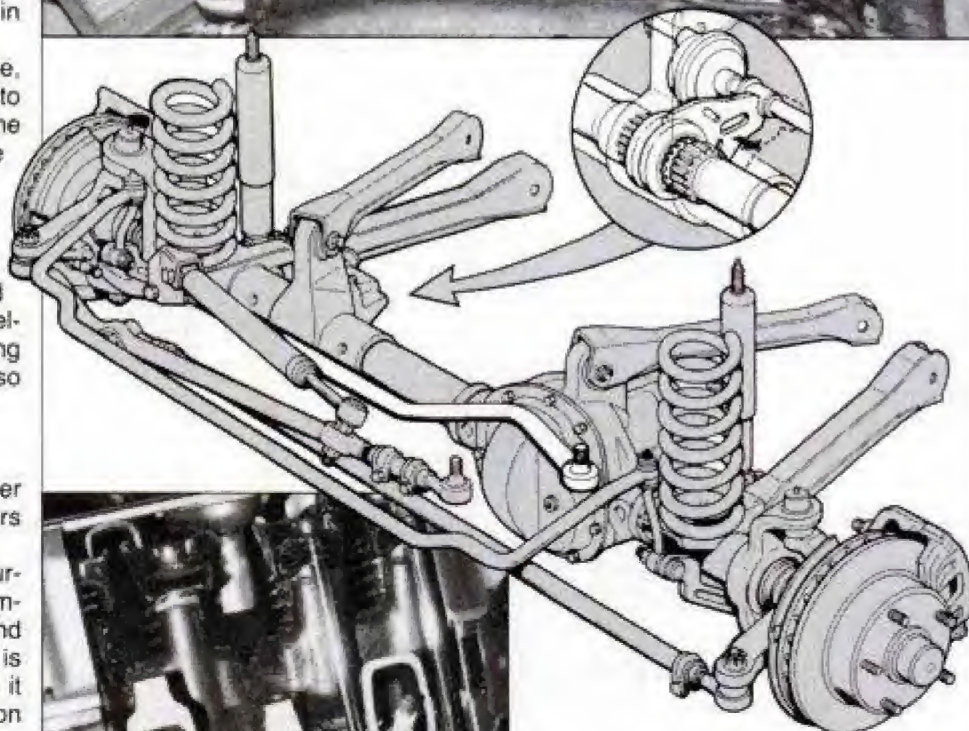
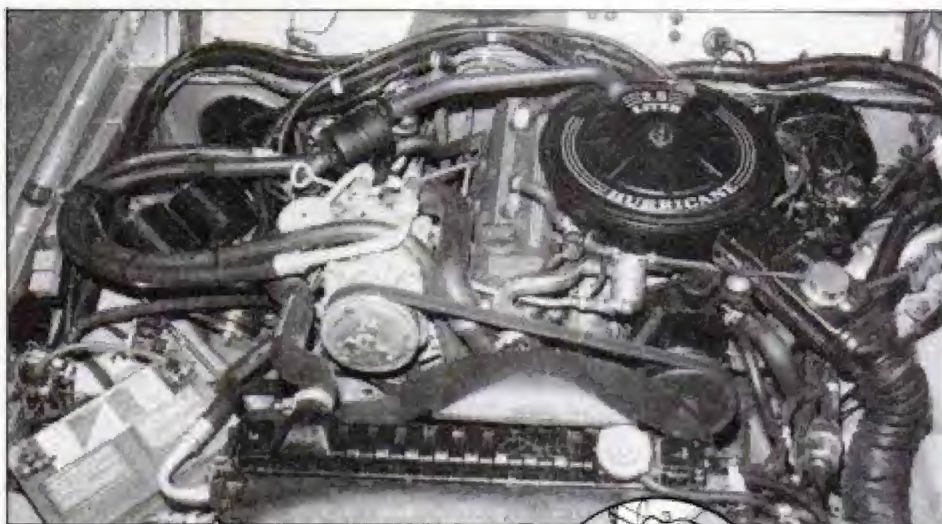
### Engineering exercise

So the cut-down is really an on-paper engineering exercise, and the cylinders "chopped out" are Nos. 2 and 4.

The cylinder head is all-new, featuring a double-quench combustion chamber. This means that at the front and rear, the chamber is shaped so there is very little space above the piston as it rises to the top on its compression stroke.

The rising piston pushes the air-fuel mixture from the limited spaces toward the wide-open area in the center of the chamber. The push causes the mixture to become turbulent, promoting more uniform mixing of the air and fuel. Result: The mixture burns so quickly from the spark that it is less prone to produce knock, even with regular unleaded. This is called fast-burn and oth-

*(Please turn to page 133)*



AMC's new 2.5-liter Four (top) replaces the "Iron Duke" that AMC used to buy from GM. Like the Duke, this new Four is a re-engineered Six. Quadra-Link front suspension (above) is said to correct front-wheel hop on downsized Jeeps. New combustion chamber on AMC Four (left) is equipped with two "squish" areas.





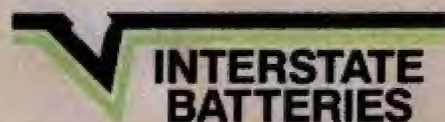
**If our battery can  
make this Bulldog bark,  
we can make your Bronco buck.**



Interstate Battery. No matter what you want to start we've got a dependable, hot-firin', heavy-duty battery that'll get you crankin' in even the worst temperatures. And if you need service anywhere, we have over 94,000 dealers all across America to help you.

Whether you want an auto, truck, farm, boat or motorcycle battery, get the best battery going by seeing your Interstate Battery dealer...there's one near you.

Interstate Battery System of America, Inc., Dallas, Texas 75243





## LOOKING UNDER THE HOOD

# CHRYSLER GOES TURBO

**W**hen you've been pushing fuel economy and durability, it's tough to suddenly find the market is looking for power. Chrysler's '84 approach is to concede it isn't the fastest, but lots faster than before, and still fuel-efficient and durable.

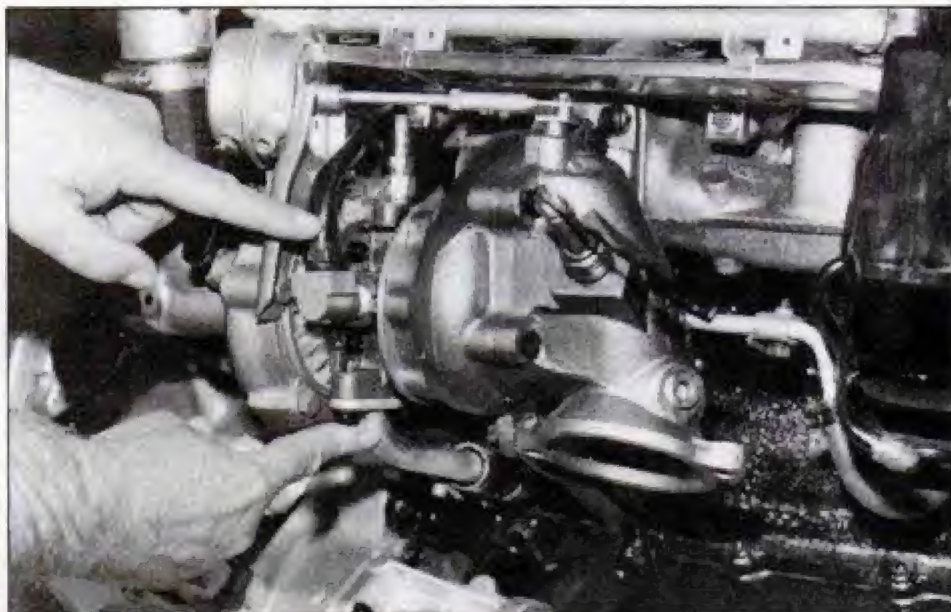
The Garrett AiResearch turbo is the big move. Bolted to the 2.2-liter four-cylinder and combined with individual-cylinder fuel injection, it jacks horsepower from 98 to 142. Because turbocharging is power on demand, fuel economy numbers still are good.

The engine has a beefier bottom end to take the extra power. The camshaft has less valve overlap and the piston rings are a tighter fit, both steps that hold in the fuel charge during turbo boost. The reduced valve overlap also improves low-end performance, before turbo boost comes in.

Most important for Chrysler's durability image, the turbo itself is water-cooled, a first for a passenger car sold here. Water-cooling keeps the turbo bearing and oil from baking even when the engine is shut off. At that time, other turbos are in hot soak, which causes oil to coke and the turbo bearing to run with inadequate lubrication as it slows down.

The water-cooling continues (even though the pump has stopped) by a thermosiphon effect. Hot water rises and flows away from the turbo, and cooler water flows in, resulting in a modest circulation pattern. It's not as good as with the pump, but bearing and oil never go above 300° F., compared with 600-700° F. during engine-off hot-soak period of other turbos. A half-century ago, many engines didn't have water pumps; they were cooled by thermosiphon circulation.

With the sharp reduction in bearing and oil temperatures, Chrysler can easily go with a 7,500-mile oil and filter change. (Compare this with the 3,000-5,000 typical of many turbo-charged engines.) Chrysler also has incorporated an automatic fuel shutoff that cuts in at 6,800 rpm to prevent overrevving. All this protection is needed because



*Twin water hoses (above) cool the vital turbo bearing on 142-hp version of Chrysler Four. Circular dampers on the axle shafts (center) help to reduce vibrations on four-cylinder engines in '84. A 24-message vacuum fluorescent dash (bottom) lights up like the half-time show in Ms. Pac-Man when you trigger its test sequence.*

Chrysler is including the turbo in its five-year, 50,000-mile warranty, and obviously it doesn't want to take a financial bath.

Reliability also is important because the turbo is going into Chrysler's E-series sedans as well as the Daytona-Laser sports jobs. The only reason E-sedan buyers will take the turbo is to get decent performance with a careful, not

possible with the naturally aspirated engine in cars of that size. These buyers expect a really reliable engine.

The extra performance of the turbo created a problem for Chrysler engineers: very noticeable torque steer.

All cars in that category tend to steer toward the longer axle shaft when torque is applied, and the greater the

*(Please turn to page 154)*



# All these oils would love to say they give you the best engine protection.



## But only one can.

Surprised? You shouldn't be. If you're using an ordinary oil, how can you expect to get anything more than ordinary engine protection?

Ordinary oils just can't give you the extraordinary protection Mobil 1<sup>®</sup> synthetic oil was designed to give you.

Mobil 1 gives you better lubrication than ordinary oils, helps protect your engine better from friction and wear and also helps it stay cleaner, run smoother and last longer.

And as incredible as it may sound, Mobil 1 can even protect your engine up to 500° F above

and way down to 35° F below.

Besides protecting your engine a lot better, Mobil 1 also protects it a lot longer. Because it's the oil that can take you 25,000 miles or one year (whichever comes first) between oil changes.\*

If protecting your engine is important to you, change to Mobil 1. You can't get better engine protection. And nobody can change that.

\*API oil as needed. New car owners, follow warranty and/or dealer. Special engines, follow manufacturer's instructions.

**Mobil 1. The official oil of the 1984 Winter Olympics.**



Sponsored by

### 100% Synthetic Motor Oil

Saves you gas and oil changes

1QT

©1984 Mobil Oil Corporation



## LOOKING UNDER THE HOOD

# FORD REFINES TURBOS

**F**ord's so-so record with the turbo should undergo a spectacular reversal in 1984. The company that could barely get a limited run under way in 1980 has 10 turbo models in '84, and one is right up there with the most sophisticated designs.

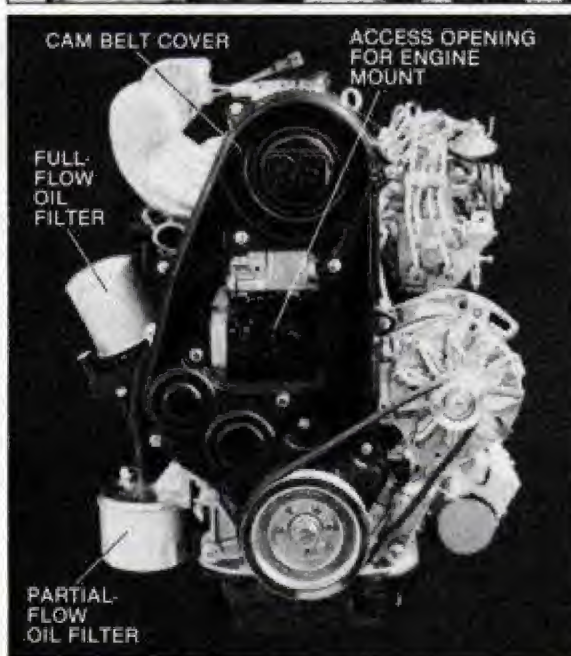
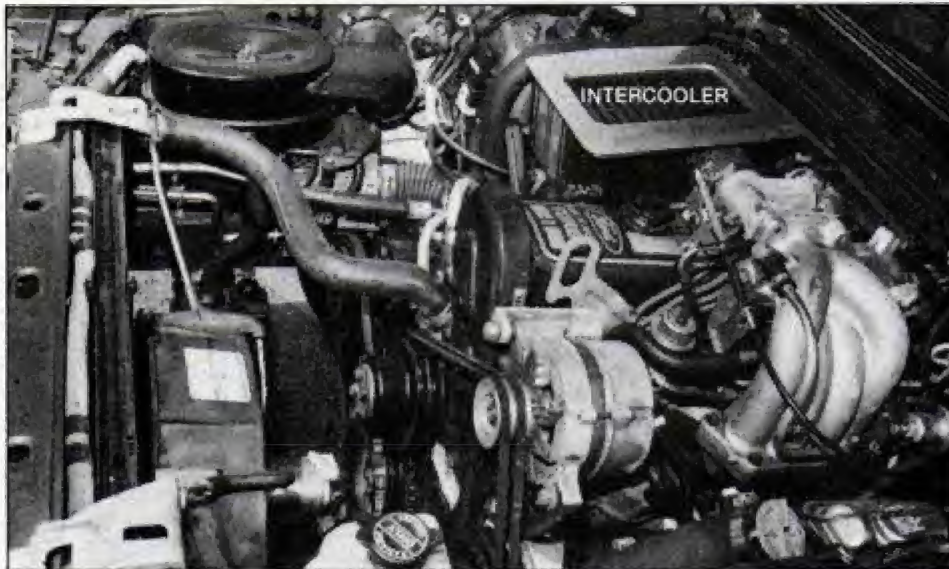
Power boost on the 2.3-liter, fuel-injected Four in the Mustang SVO turbo will be torque-regulated by a computer wired to intake airflow and barometric sensors. With this setup, the computer can calculate the air mass that must flow into the engine at peak torque and rpm (210 ft.-lb. at 3,000). The computer locks in on that airflow and allows the engine to maintain it (and therefore peak torque, too) by increasing turbo boost pressure, typically up to 14 p.s.i.

Boost pressure could be higher or lower, depending on air density. A solenoid valve is spliced into the pressure hose to the wastegate-controlling diaphragm unit, and the computer opens and closes the solenoid valve to regulate boost. Torque regulation of boost is in the 3,000 to 4,400-rpm range. Above 4,400, exhaust back pressure builds up, slowing exhaust gas flow, so boost drops. Peak horsepower of 174 comes in at 4,500 rpm. Also, there's a knock sensor on the intake manifold and if it hears knock, the computer retards spark timing.

These design and operating features are similar to the Volvo GLT and the '84 Buick V6 turbo. But the SVO also has some unique features. One is a high-low octane switch, so the computer can pick the best spark advance curve for the gasoline.

Another is the intercooler, a heat exchanger in the airflow circuit. As a turbo compresses intake air, the air gets hotter and thins out. Cold ram air from outside and the hot compressed intake air both flow through the intercooler. The intake air is cooled, so it becomes denser, for more power. In the 174-horse SVO, intercooling is worth about 35 of those horses.

The SVO engine also has an oil cooler, plus spark-advance curves that keep the exhaust relatively cool. So



*Turbo intercooler (top) adds 35 hp to SVO Mustang. Dual oil filters on 2.0-liter diesel engine permit a 7,500-mile oil-change interval (above, left). Running the engine mount through the cam belt cover helps to squeeze the transverse diesel in place. The Lincoln air springs (above, right) are computer controlled.*

when the engine is shut and oil circulation stops, Ford claims, oil in the turbo doesn't get so hot that it evaporates and leaves a coke residue that blocks lube passages (common on other turbos).

Ford also has a turbo for the 1.6-liter

Four in front-wheel-drive cars. Although smaller and simpler than the SVO, it has internal oil cooling. After some of the oil pumped into the turbo lubes the cool thrust bearing, it flows through a

*(Please turn to page 155)*



# Master Keys to Car Care



through the repair and maintenance procedures.

This handy packet can be kept very conveniently in your car. Referred to at a moment's notice! If your battery and cable need checking you pull out folder number 11 and find the answer. To repair a car dent, folder number 1 will show you how. Why isn't the air conditioner keeping your car cool? Number 12 has the answer. IT'S THAT SIMPLE!

This information packet will help keep your car in top running order and will show you how to repair your car if something does go wrong, especially on an isolated road or highway. Just think how convenient it will be and the money you can save.

**PM's Master Keys to Car Care \$4.95 is available for**

Send check or money order to: Popular Mechanics, Box 1014, Radio City Station, New York, NY 10101.

For faster mail service add an extra \$1.00

Popular Mechanics is a Publication of Hearst Magazines, a Division of The Hearst Corporation.

**If you drive a car, you need these Master Keys!**

POPULAR MECHANICS MASTER KEYS TO CAR CARE packet can help you out! In this handy packet you can find your basic car repair needs in step-by-step instructions, all shown on numbered sheets, supplemented by photos and diagrams that show what you'll see under the hood of your car as you go



## LOOKING UNDER THE HOOD

# GM DROPS DISTRIBUTOR

**T**he '84 Buick turbo V6 is America's first gasoline engine without a distributor, and the first with port-type sequential electronic fuel injection.

The distributor and coil are replaced by a module containing three double-end coils with a plug wire connected to each end. A sensor at the crank pulley tells the module's electronic circuitry when No. 1 and its companion cylinder, No. 4, are at the top of their strokes, one on compression, one on exhaust. The module then signals the computer.

When the computer gets the signal, it triggers one of the coils, sending spark voltage out of each end to the plug wires. One spark ignites the fuel mixture, while the other fires harmlessly in the exhaust.

The module's electronic circuitry also can operate the ignition in case of some computer malfunction.

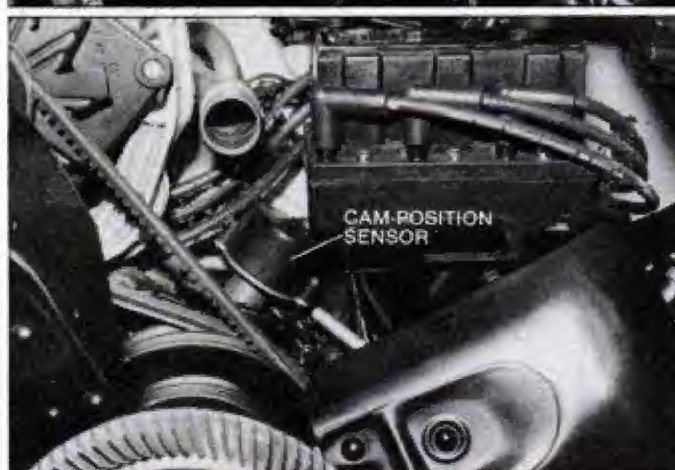
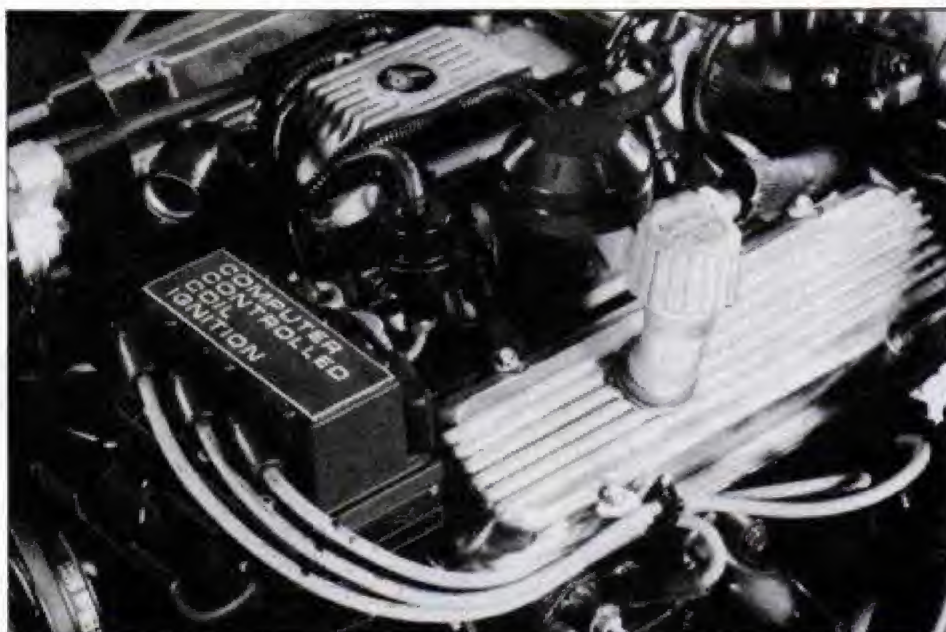
The hole that used to be for the distributor now has a sensor for camshaft position, so the computer can distinguish between cylinders 1 and 4. This isn't necessary for ignition, but for the fuel injection. With the sequential system, only the cylinder on compression gets the squirt, so a No. 1 signal is needed as a starting point.

Another approach to port-type fuel injection (used on the naturally aspirated '84 V6) is to squirt into all intake ports simultaneously, twice per rpm, injecting half the fuel each time. Buick claims sequential squirting improves idle and performance.

Regal horsepower is up from 170 in '83 to 200, but most of that is from '84 improvements to the turbo system. Like the Mustang SVO, the '84 Buick turbo has an electronic boost control solenoid valve and an airflow sensor. The Buick computer also uses the airflow signal to calculate and maintain optimum boost for max torque, between 2,400 and 4,000 rpm. Peak boost pressure is around 14 p.s.i.

If the knock sensor is triggered, the computer not only retards spark, but also may cut boost pressure. If knock is severe, it may drop boost immediately. The Buick turbo doesn't have the

(Please turn to page 156)



Buick's turbo V6 engine has an all-electronic ignition that eliminates the distributor (top). A black box with three coils fires two sparkplugs at a time, one at the end of a piston's compression stroke (as usual) and the other at the end of the companion piston's exhaust stroke (which is harmless). A camshaft-position sensor replaces distributor (center) and provides information for the sequential fuel-injection system. Movable control pods (bottom) on the '84 Camaro Berlinetta bring the dash-mounted pushbuttons to the driver whose reach falls short of Wilt the Stilt's.



# WE TOOK CHAINS OFF GARAGE DOOR OPENERS FOREVER.

## **CHAIN DRIVE OPENERS ARE A HASSLE.**

Until new GENIE® Trac-Drive™, most do-it-yourself garage door openers were driven by greasy, old-fashioned chains. Trac-Drive replaces those noisy, bicycle-type chains with a super tough, space age drive system that

*never needs grease or adjusting — ever.*

## **TRAC-DRIVE GOES TOGETHER FASTER AND SIMPLER.**

Fewer parts mean you'll get the job done in a couple of hours. And no chain means no mess and no maintenance for years of proven GENIE dependability.

Take this ad to a store that carries garage door openers. Compare GENIE Trac-Drive quality and features to any other opener. You won't settle for anything less than GENIE for *your* family.

**UNCHAIN YOUR FAMILY THIS WEEKEND.** Don't let the hassle of installing a chain drive opener keep your family out in the cold. Give them the safety and convenience of GENIE Trac-Drive. Remember, only GENIE has it.

NORELCO®

# GENIE®

*Genie welcomes the ones you love home...*



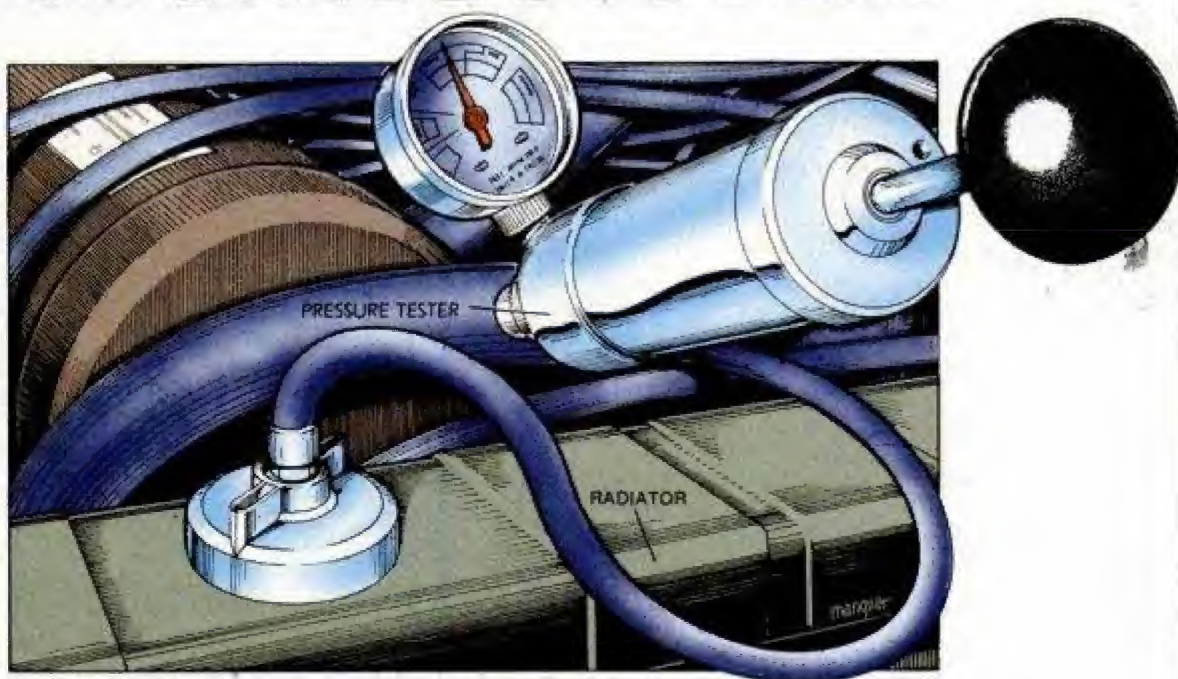


# PREWINTER CAR CARE

New car or old, it'll soon have to cope with the bitter cold. How well your automobile serves you this winter depends entirely on how well you prepare it.

## SECTION ONE

### COOLING SYSTEM



To check for leaks, use a pressure tester connected to radiator in place of cap.

**A** clean, efficient cooling system, filled with the right proportion of the correct coolant, not only will protect your engine, but will help keep you warm, as well.

Most vehicle manufacturers recommend that the cooling system be inspected and tested yearly, and backflushed and refilled every two years. If you intend to do it yourself, without the help of a power backflushing machine, an annual change is probably best. Since a cooling system maintenance includes a check of antifreeze protection level, it's an obvious part of prewinter maintenance.

Begin with a check of the belts and hoses. You don't want to pour a lot of expensive new antifreeze into a cooling system that's on the verge of failure.

Examine the hoses carefully for signs of cracking, swelling or oil and grease contamination. Take a particularly good look at the area just behind the clamp. Sometimes you'll find that the clamp has started to work its way through the hose. A hose can look good on the outside and be seriously deteriorated on the inside. Black flecks in the coolant or in the top of the radiator may be a sign of hose deterioration.

Testing by aftermarket manufactur-

ers has shown that hoses last only about four years. It's a good idea to replace your hoses after four years even if they look good. This will protect you against unexpected failures.

Defective fan belts are not as easy to spot as they once were. Belts used to be covered with a fabric wrapper that would begin to come apart before the belt failed. However, as a result of changing original equipment specifications, most belts are now manufactured without the protective wrapper. These belts can snap without warning. Check for cracking on the bottom of the belt or glazing on the sides. Again, some man-





## It's worth its weight in tough protection.

If you're driving one of today's precision-engineered, high performance cars, you need tough engine protection. That's why Pennzoil GT Performance is specially formulated in an SAE 20W-50 weight to stand the strain high RPM's put on motor oil. GT Performance is also available in an SAE 20W-40 weight.

This extra weight oil has the

staying power to keep giving your engine the protection it needs—even under intense pressure. And GT Performance has built-in friction reducers to help high revving engines run easier, increasing their efficiency.

Pennzoil GT Performance

provides tough protection, too, for hard-working, load-carrying pick-ups, vans and RV's.

A top quality product of Pennzoil's long on-track experience...this is the oil with the extra weight to give tough engine protection for your high revving, high performance car.

### **Pennzoil GT Performance Motor Oil**

Extra Weight for Tough Protection





## SMALL ENGINES WORK HARDER THAN LARGER ONES

Yes, 4 cylinder engines work harder than 8 cylinder engines to travel the same distance. When the 4 and 8 cylinder engines have both traveled 10,000 miles, the 4 cylinder engine has worked the equivalent of nearly 20,000 miles. They also run hotter — tending to shorten the life of your oil by creating varnish, gum and sludge.

All this means more wear and tear on your smaller 4 cylinder engine. It needs more care and attention. A quart of Rislone with each oil and filter change will help get rid of those deposits that rob your engine's efficiency and smoothness. Clean engines run better, longer and more economically than dirty ones.

Use Rislone at oil change time or when you're down a quart.

Get the big, yellow, red and black QUART can of Rislone at discount stores, retail auto chains, and parts stores everywhere.



**FREE:** 32 page LUBE TIPS booklet. Information, ideas and discussion about problems, performance and lubrication. Send self-addressed, stamped envelope 4 1/2 x 6 1/2 or larger.

### THE SHALER CO.

Waukegan, WI 53983

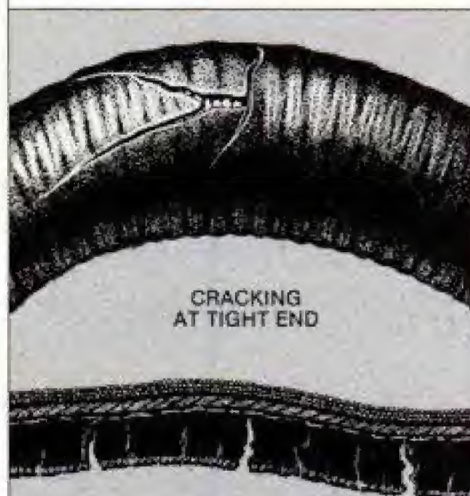
In Canada: Warren Packaging Co., Ltd.  
Scarborough, Ontario, M1R 4G2

## COOLING SYSTEM

Manufacturers suggest that, regardless of how good they look, belts that are made without the fabric wrap should be replaced every four years.

While you're staring at those belts, don't forget to check tension.

It's best to use a tension gauge and check manufacturer's specs in a manual, but a little push with your thumb in the center of the belt's longest span is better than no check at all. If you detect more than about an inch of deflection under moderate pressure, you should tighten the belt.



CRACKING  
AT TIGHT END



UNDERSIDE BELT CRACKING



HOSE CLAMP DAMAGE

**Shown above are three problems common to any car. Makers suggest replacing hoses and belts every four years.**

Once you've examined all the belts and hoses, make sure the engine is cold and remove the radiator cap. Run the engine with the cap off and the heater on until the upper radiator hose is hot. Then stop the engine and drain all the coolant. Remove and replace any defective or aging belts and hoses after allowing sufficient time for the engine to cool.

### Testing the thermostat

If you have any doubts about your thermostat due to inefficient heater

operation or engine overheating, now is the time to test it. To test, simply suspend the thermostat in a pan of water along with a thermometer. Heat the water and check to see when the thermostat opens. If it doesn't open at the specified temperature, you must replace it.

Once you have installed any necessary new components, fill the system with water, turn on the heater and pressure-test the cooling system. Install the pressure tester onto the filler neck of the radiator and pump up the specified amount of pressure. Then carefully check all connections, the heater control valve and the thermostat housing.

If these checks fail to uncover the source of pressure leakage, use a flashlight and mirror to check the vent hole and seal of the water pump. If further checks are necessary, support the front of the car on jackstands and check all the core plugs.

### Flushing the system

Once you have determined that there are no leaks, remove the tester, add a cooling system flush treatment, run the engine until it's warm again, then shut it off and drain all the water. Repeat this step, using plain water three or four times until the drained water runs clear. Remove the recovery tank and clean it out.

Reinstall the recovery tank and fill the system with enough antifreeze to provide at least 50-percent antifreeze, but no more than 70 percent. (Freezing protection deteriorates as the antifreeze percentage exceeds 70.) Fill the recovery tank to the "full cold" level.

If your vehicle has an aluminum radiator or aluminum engine parts (cylinder head, water pump, and so on), you should use an antifreeze that's formulated especially for use with aluminum engine parts.

Some import manufacturers insist that their own antifreeze be used for refills. This is actually unnecessary, because any of the popular aftermarket labels that are formulated for aluminum will provide excellent corrosion, boilover and freeze protection in these vehicles.

If your cooling system has not been flushed on an annual basis and corrosion and dirt have accumulated, ask your neighborhood mechanic to do a power backflush, using chemical cleaners.

Check the radiator pressure cap with the pressure tester to make sure it will maintain cooling system pressure, then reinstall it.

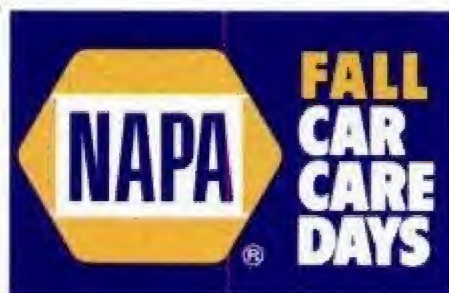
FM





**FASTER THAN A FRIGHTENED WHITETAIL.  
MORE POWERFUL THAN A RAGING GRIZZLY.  
ABLE TO LEAP DEEP DITCHES IN A SINGLE BOUND.  
TOO BAD IT WON'T START.**

Why put featherweight parts in a heavyweight machine? This hunting season look for this sign at participating stations, garages and NAPA stores. And keep your beast of a machine running super strong with tough NAPA parts. Or your hunting trip could come to a standstill.



Check Your Yellow Pages



## SECTION TWO

# COLD STARTING

**T**he single most common cause of winter no-starts is improper operator starting technique. The right method, as most vehicle manufacturers recommend, is that you push the throttle to the floor once or twice and release it. This sets the choke and provides a shot of fuel from the accelerator pump.

If the recommended procedure fails to start the car, don't keep trying to modify your method until you find a procedure that works. Instead, determine why the cold-start mechanism isn't working.

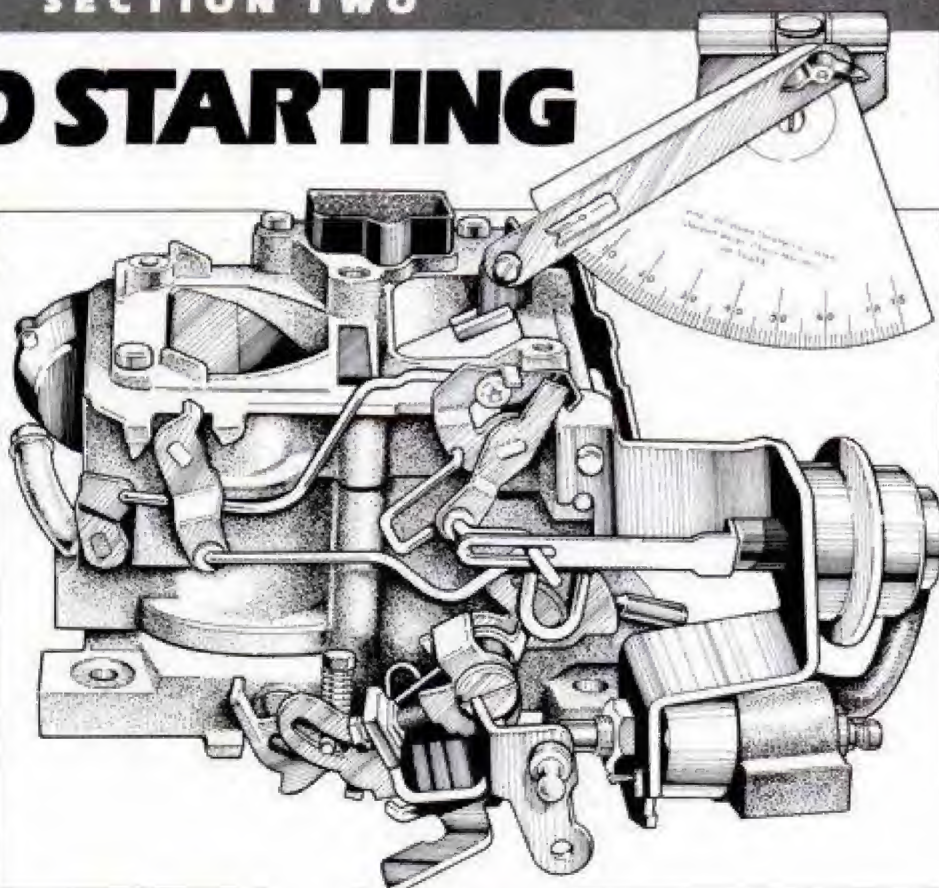
Before you start looking for choke problems, however, make sure the engine is properly tuned. The best choke system in the world won't fire an engine with a few bad plugs or a clogged fuel filter.

To diagnose a choke problem on most carburetor-equipped cars, it's necessary to leave it outside on a cold night. The next morning, unscrew the air cleaner before you even attempt to start it. While watching the choke valve, open the accelerator linkage. The choke valve should snap closed, and the fast idle cam, which holds the throttle open for cold starts to provide faster idling, should slip into position. There should be no drag or binding.

Prewinter maintenance should include the cleaning of the choke mechanism with carburetor cleaner. Don't lube the linkage. This will only attract dirt, causing premature failure.

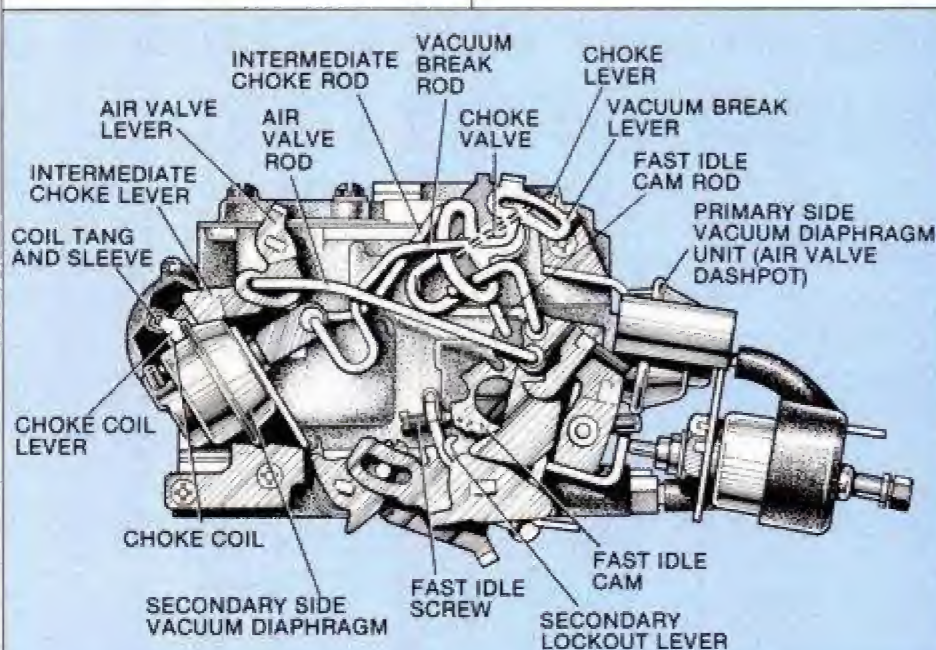
Once you've determined that the choke valve isn't binding and is moving into position, hold it open and depress the throttle fully while watching the accelerator pump nozzles inside the throat of the carburetor. They should provide a stream of fuel. If they don't, you have a carburetor or fuel system problem that must be resolved before the cold-start system will function.

If both the accelerator pump and the choke valve are functioning, you can adjust the choke valve and the fast idle. On some cars this is just a matter of indexing the choke housing to a specific position and adjusting the fast idle cam linkage so the throttle screw falls on a



A choke valve angle gauge (above) is needed to adjust the choke on 1978 and newer GM cars with two-barrel or four-barrel carburetors. Magnet holds the gauge to the choke plate. The built-in bubble level is used to set the precise

angle of the choke plate. The angle can be changed by carefully bending the fast idle cam rod (below) with a special tool. The fast-idle screw must be on the second step of the fast idle cam when the adjustment is made (see details in text).





The Horizon III—Turco's new unvented gas heater—operates more economically than any other spot heater money can buy. Fueled by natural gas, it warms you for less than 1/3 the cost of electric spot heat. And that's according to the U.S. Dept. of Energy. (see box)

# NOT ALL WARM SPOTS ARE CREATED EQUAL.

## GAS HEAT AT THE SPEED OF LIGHT.

The Turco Horizon utilizes the radiant heat principle. Which means the heat energy of LP or natural gas is converted to infrared rays by ceramic-burner tiles. So instead of just relying on air currents to spread heat, Turco sends heat outward—about 186,000 miles per second.

DOLLARS	
PER MILLION BTU'S	
GAS	\$3.90
ELECTRIC	\$16.32*

## ALMOST PERFECT COMBUSTION.

Turco's fuel efficiency is just a hair under 100%. Which means you get the most heat for your money. It also means clean heat.

No smoke. No odors. And no venting.

## GREAT LOOKS AREN'T EVERYTHING.

Turco installs easily and permanently in the wall. It's small—only 25" x 17." And we think it's beautiful.

We know it's safe. Because it's wall mounted, it can't tip. Ignition is automatic, all you do is press a button. And if oxygen gets low or the pilot light goes out—it shuts itself off—automatically. Naturally it's A.G.A. certified.

## CENTRAL HEAT SAVINGS.

If your family has a favorite place—that's a great place to install a Turco. So you can keep the thermostats down and still be nice and cozy. You can relegate Turco to places you haven't been heating—like the garage. In fact, any place you might use a space heater would be a good place for Turco (check local codes for specific requirements.)

## THE SPOT-HEAT EXPERTS.

Pardon the boast, but Turco is *the* name in spot heat. Our Kerosene Spot Heaters have earned a (pardon the pun) spotless reputation. And Turco is the largest American manufacturer of unvented gas spot heaters. So if you're interested in our new Horizon or any Turco Spot Heater, call us and we'll tell you the name of the dealer nearest you.

**1-800-851-8481**



# Turco

WE HAVE A WARM SPOT FOR YOU.



\*U.S. Average Energy Costs—U.S. Department of Energy.





## The easy step

Removing the paint and varnish... with versatile KWIK ALL-PURPOSE PAINT REMOVER

Remove all the paint and varnish on the job easily — and you're the boss! KWIK All-Purpose handily does the job for all kinds of wood and synthetic surfaces. Apply... then wash or scrape right off. The choice of professionals, yet so easy to handle. From America's paint-removing specialist. At your local paint or hardware dealer. If your dealer doesn't have KWIK, write: Chemical Products, P.O. Box 400, Aberdeen, Md. 21001.

## A space age polish that removes and prevents pitting!



### MONEY BACK GUARANTEE!

**MET-ALL** aluminum polish. Cleans, polishes, waxes and protects in one application. Safe, fast, easy to use.

**MET-ALL** shines aluminum and all other metals to a mirror-like finish. Great for home, auto, marine and aviation use. Tested and approved by the three largest producers of aluminum.

**MET-ALL**. Removes the dullness, not the metal.

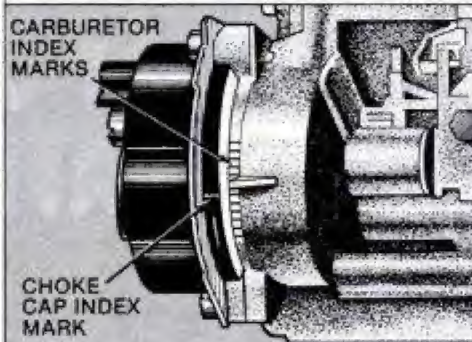
Ask your retailer or write to:  
**DARS MET-ALL INDUSTRIES, INC.**  
29-00 Review Ave., Long Island City,  
NY 11101 (212) 937-3535

## COLD STARTING

specified step. On other vehicles with choke housings in the intake manifold, there are reference points that can help you determine if the choke is closing fully. In either case, you'll need a general auto repair manual or the specific factory service manual for your car.

A choke valve angle gauge is necessary for choke mechanism adjustments on 1978 and newer GM carbureted cars. The adjustment procedure on these cars begins with a check of choke valve closing. Specific size rod gauges (or drill bits) are used to check the choke valve closing. Once this adjustment is made, the fast idle cam relation is adjusted with a choke valve angle gauge. This gauge is available at auto parts stores.

To set the fast idle on GM cars with



On many cars, the choke is adjusted by aligning the index mark on the choke cap with the specified mark on the carb.

two- or four-barrel carbs, rotate the gauge scale until the zero is opposite the pointer. Then position the magnetic base of the gauge on the choke valve with the choke closed. Turn the bubble level until the bubble is centered. Next, rotate the scale to the degree specified in the owner's manual. Then position the fast idle cam so the throttle screw sits on the second step. Close the choke and push the vacuum break lever toward the tang on the choke linkage. The angle gauge's bubble should center. If it doesn't, bend the fast idle cam rod until it does.

The angle gauge is also used to adjust the vacuum breaks that help control choke position during warmup.

If you want to have a professional mechanic do the job for you, ask him if he has an angle gauge for GM choke adjustments. If he doesn't know what you're talking about or tells you he doesn't need one, find a new mechanic. A mechanic who is NIASE-certified in engine tuneup should be familiar with this procedure.

PM

**LYNCHBURG**  
HARDWARE & GENERAL STORE  
42 Main St., Lynchburg, TN 37352



### JACK DANIEL'S FIELD TESTER SHIRTS

These are just like the shirts old Wallace Beery used to wear. Of course, my shirts have the added feature of a "Jack Daniel's Old No. 7 Field Tester" on the chest. Made of 50% cotton-50% polyester they wash easy and keep their shape. Colors: Natural with brown lettering, red or black with white lettering. Sizes: XS, S, M, L, XL. \$15.00 delivered.

Send check, money order or use American Express, Diners Club, Visa or MasterCard, including all numbers and signature. (Add 6% sales tax for TN delivery.) For a free catalog, write to Eddie Swing at the above address. Telephone: 615-759-7184

Save Time! Save Money!  
Mill Supply Sells Over  
1,000 Different Die-Formed

## STEEL REPLACEMENT PANELS

To Repair Rust or Collision Damage on Many American Cars, Pick-up Trucks and Vans and Most Imports



Sheet Metal Info on Pick-ups and Vans **\$100**

Lists sheet metal parts and accessories available for Chevy, GMC, Plymouth Dodge vans and pick-ups, and Ford Econolines and Club Wagons. (\$2 Canada.)

36-Page **TABCO** Import Car & Truck Catalog **\$200**

Lists over 1,000 steel replacement panels, fenders, hoods, grills, rockers, rear quarters, etc. (\$3 Canada.)

Send check or money order, allow about 3 weeks for delivery. VISA and MasterCard accepted. ON PARTS ORDERS ONLY.

Send self-addressed stamped long envelope for FREE information on any ONE American or import car or truck.



Dept. PM-310 **Mill Supply**  
3241 Superior Avenue • Cleveland, OH 44114  
Phone (216) 241-5072



# USE GAS FREE FOR A MONTH

**Install a Bryant Formula™  
gas furnace and we'll  
reimburse you for your  
highest monthly gas bill.**

Not just any bill, but your highest gas bill during the first heating season.

Now it may sound as if we're going to extremes, but think about it. If we weren't absolutely sure the high-efficiency Bryant Formula furnace would help you use less gas, we wouldn't make this offer.

If you use gas now, you know what efficiency is. And the Bryant Formula helps make gas an even better value today, and for years to come.

So you save now. Save later. And save on a whole month's worth of gas heat the first year. It's probably the best energy-saving measure you can take this winter. Without going to extremes.

Call your participating Bryant dealer for details. For his name call toll-free, 1-800-HOT-SALE.



**bryant**®

A new generation of super-efficient gas appliances make America's best energy value an even better value today and tomorrow.

© 1983 American Gas Association

## Gas gives you more for your money.



**SECTION THREE**

# ENGINE TUNEUP

**T**he term tuneup is a confusing one. That's because the whole concept of what a tuneup should be is changing. We like to divide tuneups into two categories: maintenance service tuneups and diagnostic tuneups. A maintenance tuneup is the kind you can do in your driveway. It involves replacement of various components—like sparkplugs, filters and ignition parts—at regular intervals. A diagnostic tuneup, on the other hand, is the procedure that must be performed when regularly scheduled replacement of parts that wear out fails to remedy an engine fault. Due to the complexity of modern engine control systems, sophisticated and expensive test equipment is needed to perform a diagnostic tuneup properly. If you complete necessary maintenance procedures and find that your engine still won't run right, professional attention is usually called for.

However, you can still do a maintenance service tuneup. The most obvious part of this procedure is sparkplug replacement. While some vehicle manufacturers suggest that 30,000-mile replacement is adequate, most mechanics and some other manufacturers recommend 20,000-mile replacement. On vehicles with electronic ignition, we prefer to clean and gap plugs at 15,000 miles, then replace them at 30,000.

If you do clean and gap your plugs, file the top of the electrode slightly to sharpen the edges. Do the same with the ground electrode's front edge and lower surface. Discard plugs with more than a slight amount of electrode erosion.

Don't reinstall a plug that you've dropped on the ground; its insulator may be fractured internally. Gap plugs to the recommended setting.

Don't juggle sparkplug heat ranges in an effort to compensate for other engine problems. Today's plugs, with their wide heat ranges, are generally satis-



*Check ignition timing by following steps described on the tuneup data decal under the hood. When timing at idle is correct, check the vacuum and centrifugal advance.*

factory for all types of driving in the recommended heat range.

Replace all filters at least at the recommended intervals. In high dirt or pollution areas, replace air filters more frequently.

Clean your plug cables and remove corrosion from terminals. Check cables for burns, cracks or other damage. Check for boot fit. Replace any defective cables. If the cables are in generally

poor condition, replace the whole set.

Inspect the inside of your distributor cap and the ignition rotor for cracks, carbon tracking, erosion and corrosion. Some ignition parts are coated with dielectric compounds to prevent corrosion and arcing. Make sure you use the manufacturer's recommended compound to coat new parts in a similar manner. On most engines the centrifugal advance weights are under the



# "HOW TO BE A GREAT FIXER-UP-ER" SALE!

## GREAT NECK HACKSAW

Adjusts from 10"-12" in length. Blade adjusts to 4 angles. Reg. Price \$3.25

**SALE PRICE \$1.97**

#50

## "REBUILD YOUR HOUSE FOR \$38"

(a cheap novel)

## BLACK THUMBNAIL

## LUFKIN® 25' UNILOK TAPE

Positive toggle lock. 3/4" wide. High impact styrene case. Reg. Price \$11.85

**SALE PRICE \$6.47**

#8325

## HAMMER

(for hitting thumbnail)

## DURACELL® BATTERIES

D, C, or AA cell alkaline, pack of two. 9-volt, single.

**SALE PRICE \$1.57**

## AQUA-LINE® KITCHEN FAUCET

Washerless. Single control. Chrome. Reg. Price \$47.29

**SALE PRICE \$33.93**

#1100

## STEEL-TOED BOOTS

(used for kicking nearest object after hitting thumbnail with hammer)



THAT CONFIDENT LOOK YOU GET FROM SHOPPING AT SERVISTAR®

## JOHNSON® LEVEL KIT

3 levels: 24" alum. torpedo and alum line, all for one price. Reg. Price \$9.95

**SALE PRICE \$6.47**

#HMS-1

## REMINGTON® POWER HAMMER

Makes fastening into concrete or steel quick and easy. Reg. Price \$37.95

**SALE PRICE \$26.97**

#75107426

## MISER™ CIRCLITE

22-watt fluorescent that gives the light of a 60-watt bulb. With normal use, lasts five years. Warm white. Reg. Price \$11.95

**SALE PRICE \$7.00**

#1CA22WVN

## BAGGY PANTS

(high water length mandatory)

## SAKRETE® CEMENT MIXES

Concrete, sand and mortar mixes.

**SAVE 20%**

## SAVER SPECIAL!

## SERVISTAR® LIGHT BULBS

60, 75 and 100 watts. Frosted. Two bulbs per pack.

**SPECIAL PRICE**

6 bulbs/\$2.00

See your Yellow Pages for the dealer nearest you.

Sale ends October 30.

# SERVISTAR

Hardware ★ Lumber ★ Home Centers





## Your legacy: A way of life.

Do you love the wide open spaces? Clean air? The beauty of nature? Are they a part of the legacy you have planned for your loved ones?

Owning a large piece of land in America is possibly the most important decision you will ever make. Not only will you enjoy the rare privilege and pleasure of owning a large spread of ranchland today, it can remain a private corner of America in the future history of your family. Forbes Wagon Creek Ranch is offering just 404 people the unusual opportunity to purchase a substantial tract of land right next to its gigantic Forbes Trinchera Ranch in southern Colorado.

Minimum-size family ranches are 40 acres, and vary up to 74 acres, with prices starting at \$25,000.

Here in the foothills of the magnificent Rocky Mountains,

with restricted access to more than 17,000 acres (over 26 square miles), you can hunt deer, elk, grouse, and all kinds of wild game in season. Or you can ski cross country, fish for trout, ride horseback, or just enjoy the breathtaking dawns, sunsets, and the changing seasons in the shadow of one of Colorado's highest peaks, Mount Blanca.

This exclusive preserve is the perfect place for the outdoor-lover in you, and when passed on to your children, or your grandchildren, your ranchland bestows on your heirs the privilege of an unspoiled way of life. It's a very thoughtful way to shape the futures of those who will follow you.

For more information on how you can become a part of Forbes Magazine's private mountain hideaway, write or call for our full-color brochure.

## FORBES WAGON CREEK RANCH

Errol Ryland, Manager Box 303T Fort Garland, Colorado 81133 (303) 379-3263

Sangre de Cristo Ranches, Inc., developer. This is not an offer to sell in states where not registered. NJA104-048200 NAV820068 000039-A AD18560(b). A statement and offering statement has been filed with the Secretary of State of the State of New York. The filing does not constitute approval of the sale or lease or offer for sale or lease by the Secretary of State or that the Secretary of State has in any way passed upon the merits of such offering. A copy of the offering statement is available, upon request, from Sangre de Cristo Ranches, Inc. NYAB2.78.

Obtain the Property Report required by Federal law and read it before signing anything.  
No Federal agency has judged the merits or value, if any, of this property. Equal Credit and Housing Opportunity.



**Every brake  
job needs  
Brakleen.**



**THE PROFESSIONALS' CHOICE.**



**"YOU CAN'T  
BUY A BETTER  
PROBLEM  
SOLVER!"**

as seen on  
Morning News

**HASTINGS MANUFACTURING CO.**

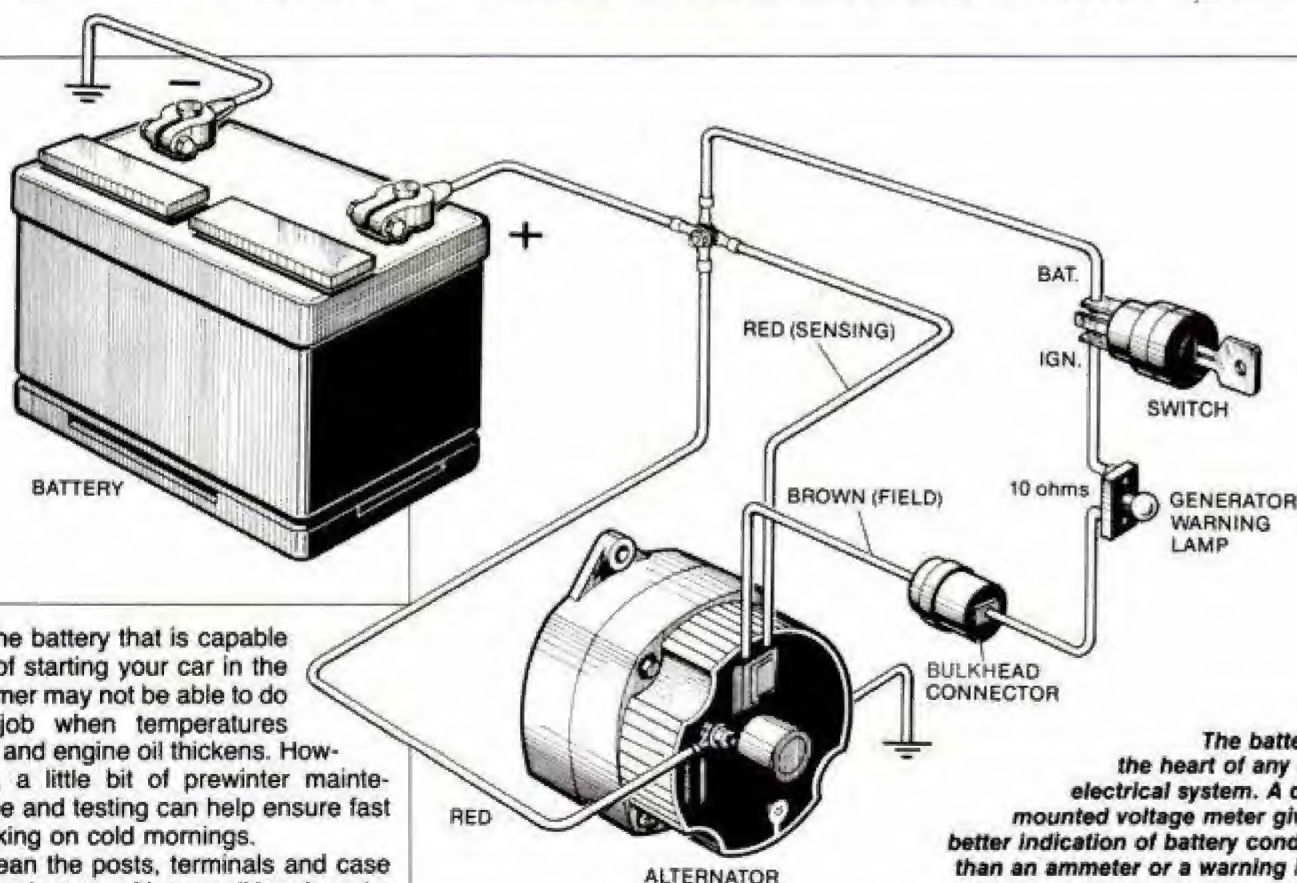
Hastings, Michigan 49058

FILTERS • PISTON RINGS • CASITE PRODUCTS • TOOLS



## SECTION FOUR

# BATTERY MAINTENANCE



**T**he battery that is capable of starting your car in the summer may not be able to do the job when temperatures drop and engine oil thickens. However, a little bit of prewinter maintenance and testing can help ensure fast cranking on cold mornings.

Clean the posts, terminals and case of your battery with a small brush and a paste made with baking soda. If corrosion is allowed to build up on electrical connections, the resistance created will limit the amount of juice available for cranking the engine and firing the plugs.

If your battery cables are equipped with bolt-on replacement terminals, disassemble and clean these, at the very least. It would be better if you replaced any such cable with one that has a terminal molded onto the cable. The clamp-on terminals allow moisture to get into the connection, quickly creating corrosion and resistance.

With conventional batteries (as opposed to maintenance-free), check the fluid level. If it's not as high as it should be, add distilled water to the proper level. If the temperature is below freezing, drive the car for at least 20 minutes so the water will be fully mixed into the battery solution. The battery could freeze and crack if you don't.

If you have a maintenance-free battery, you may be able to check the battery's state of charge. On many of these batteries, you'll find a hydrometer eye on the top of the case. This gives an indication of the battery's specific gravity, which varies in respect to state of charge.

Usually, a dark or black eye means that the battery is in need of a recharge. A green eye means the battery is at least at 75 percent of full charge (see illustration on following page). A clear or yellow indicator means that the battery is defective and must be discarded. Don't try to jump such a battery. It cannot be recharged or refilled; it must be discarded. But don't be fooled by sunlight shining through the case of a battery. This may cause a false reading on cars with clear battery cases.

With a conventional or maintenance-

free battery, you can get a good idea of state of charge and the battery's ability to hold a charge by checking battery voltage.

First, measure voltage at the battery with all accessories turned off and the engine not running. It should be *more* than 12 volts. Then disconnect the coil wire from the distributor cap and attach it to ground. Or, on cars with GM HEI ignition, disconnect the wire that is attached to the distributor connector labeled "BAT." Have a helper crank the engine for at least 15 seconds while you watch the voltmeter. The cranking voltage of a fully charged battery should be at least 9.6 volts, and a battery that is in good condition and fully charged should be able to sustain that voltage for at least 15 seconds.

If your battery is not capable of pass-

*(Please turn to page 138)*



# MONROE®

## BUMP STOPS HERE

# SALE

Buy one Monroe Radial-Matic®,  
Super Strut® or Strut Replacement  
Cartridge, get the second for

# 1/2 PRICE\*

Here's a great way to get big savings on some of our most popular ride control products. Buy one Monroe Radial-Matic, Super Strut or Strut Replacement cartridge, and get the second for half price. That's an incredible savings...50 percent off the second unit. See your participating Monroe retailer soon, while supplies last. And while you're there, be sure to ask about how you can win a brand-new Dodge Daytona Turbo Z.

*America Rides Monroe.*

\*Manufacturer's suggested retail offer off of full list price.

## THE BUMP STOPS HERE.

# MONROE®

Monroe Auto Equipment

Division of Tenneco Automotive





# A Barn For Your Back Yard

**OUR WELL-DESIGNED YARD BUILDING PROVIDES HANDSOME STORAGE FOR YARD TOOLS, POWER EQUIPMENT AND GARDENING SUPPLIES. BUILD IT FROM PLANS YOU CAN BUY.**

Your local lumber dealer may have factory-made sheds on display. Many versions will fulfill the storage needs you have - but none will match the "down-home" good looks of the PM building. It provides sorely-needed storage space for large equipment and hand tools, and a gardener's center for the family "green thumb" - with attention to design detail that is sure to make this building the hit of the neighborhood. There's a bonus too: Ours has an upstairs loft. To provide extra headroom - without using additional lumber, the loft floor is dropped, suspending it from joist hangers at the front and resting on a ledger strip in the rear. The basic dimensions are 12 x 16 ft. This permits economical use of building materials.

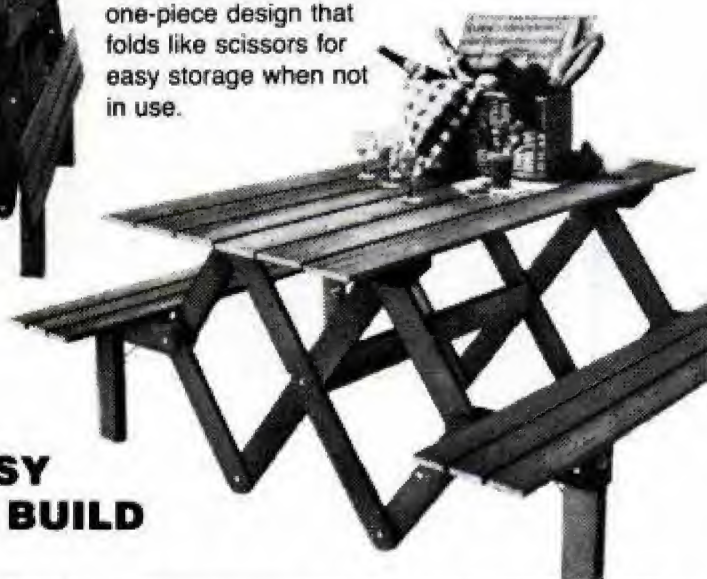


## HOW TO ORDER PLANS

The plans for the PM Back-Yard Barn consist of four 17 x 22-inch drawing sheets, a detailed instruction manual and a materials list. A single set of plans is \$10.50 (PL-1278). If you need a second set to file for a building permit, two sets can be obtained for \$17.50 (PL1278-A). Send check or money order to **Storage Barn, Popular Mechanics, Box 1014, Radio City Station, New York, N.Y. 10101.** Please allow four weeks for delivery.



**(PL-1716, \$3.95) STOWAWAY PICNIC TABLE** is clever one-piece design that folds like scissors for easy storage when not in use.



**EASY TO BUILD**

**SEND YOUR ORDER TODAY!**

**Make Check or Money Order Payable to Popular Mechanics**

Please allow three to four weeks for delivery

**POPULAR MECHANICS**

Box 1014, Radio City Station, New York, NY 10101

Popular Mechanics is a publication of Hearst Magazines, a Division of THE HEARST CORPORATION

## MORE SMART IDEAS

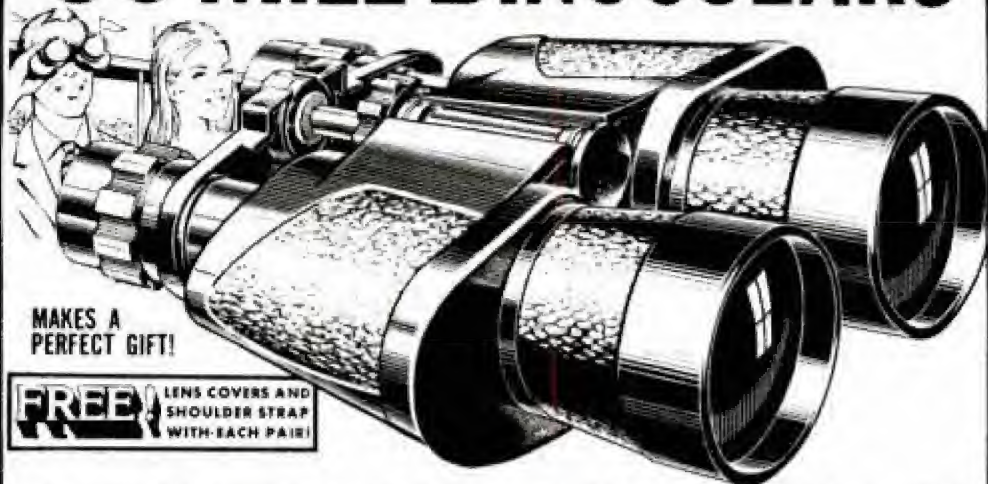


We have plans for shop tools, boats, storage houses, campers. Scuba tow, ACV, log splitter, air compressor. Smart ideas in furniture! Also dollhouses! Projects the whole family can enjoy.

And best of all—we offer a special and unique service—photocopies of past PM articles. You'll have fun just browsing through the approximately 900 different plans and projects. You'll find our GREAT WORKSHOP series listed. Also our SHOP MINI-COURSES. See it all in our new **POPULAR MECHANICS PLANS and IDEAS CATALOG (#1700). \$1.00**



# SENSATIONAL, ALL-NEW NONPRISMATIC 50 MILE BINOCULARS



Any reader of this publication can now obtain these sensational POWERHOUSE\* BINOCULARS for a fraction of the price that you would expect to pay. Only \$7.99 plus a small mailing charge brings them to your door. New space-age design. The creation of an internationally known European Optics Factory. Please don't confuse with low power, cheap, brittle imitations — this is a real he-mans instrument... loaded with long range power. Developed, engineered and proudly manufactured in Europe by optical technicians. POWERHOUSE\* BINOCULARS are the product of years of experience and know-how.

Never before and perhaps never again will \$7.99 buy so much optical value and downright pleasure! It is easy to understand why. After all, this new optical instrument is just terrific for football, baseball, soccer, horse, auto and boat racing. Also useful for secret surveillance. For bird-watching, theatre and hunting... the knurled focusing wheel locks distant views into sharp focus—it puts you where the action is!

Due to its powerful lenses, it's ideal for checking far-away happenings. Travelers use them for breath-taking panoramas. POWERHOUSE\* BINOCULARS go where you go. They're light and rugged and can be conveniently stored away in purse or

trunk. They even come with their own carrying strap for extra convenience. Four unbreakable lens covers are included — to protect your lenses from dust or scratches.

## DELUXE POWERHOUSE\* ALSO AVAILABLE

There is a limited quantity of our NEW DELUXE POWERHOUSE\* MODEL (not illustrated) on hand. It has all of the great features of the POWERHOUSE\* described in this ad PLUS Tinted Lenses. It costs only \$2 more. It is our Model No. 2301—Only \$9.99 each.

### 10 YEAR CONDITIONAL GUARANTEE

These BINOCULARS are fully warranted against Manufacturers defects for 10 YEARS. If they do not operate properly anytime in 10 YEARS, return them with \$2 to cover Handling Costs and they will be repaired or replaced FREE. Guarantee ends Dec. 31, 1993.

No. 2300—POWERHOUSE\* BINOCULARS \$7.99 each. Two No. 2300—POWERHOUSE\* BINOCULARS...Only \$13.99. SPECIAL: Three No. 2300—POWERHOUSE\* BINOCULARS...Only \$19.00. DELUXE POWERHOUSE\* BINOCULARS—No. 2301...Only \$9.99 each. Quality Carrying Case for any Model...Only \$2.00 each.

## END THE PAIN OF CRAMPED FEET WITH... PROFESSIONAL SHOE STRETCHER!



WITH SPECIAL ATTACHMENTS THAT RELIEVE THOSE EXACT SPOTS WHERE YOUR SHOES PINCH AND CRAMP!

If you are tortured by tight or ill-fitting shoes that pinch your feet and cramp painful corns and bunions, *this is the answer!* This Professional Shoe Stretcher is made of quality hardwood and will stretch and reshape your shoes to give you a "custom fit". The stretcher comes with two special nylon attachments for extra "spot-stretching" those exact spots that press on corns or bunions. Easy-twist adjustable metal handle. Now you can stop throwing away shoes that don't fit—you can wear every shoe you own in complete comfort!

No. 3066—Professional Shoe Stretcher... 6.88  
Special: 2 for 11.95

## SUPER AWL WORKS LIKE A MACHINE... SEWS LEATHER, RUBBER, CANVAS, PLASTIC, UPHOLSTERY, NAUGAHYDE & ALL TOUGH MATERIALS!



Repairs Luggage, Upholstery, Boots, Rugs, Convertible Tops, Tents, Auto Seat Covers, Awnings. Super Awl works just like a machine. Sews and repairs tough naugahyde, upholstery, leather, canvas, etc. Makes permanent repairs to luggage, convertible tops, furniture. Used by saddle & harness makers for many years to make tough, durable lock stitch—automatically! Hardwood handle holds extra needles, wrench. Comes with 30 ft. spool of tough, waxed thread.

No. 5029—Super Awl... \$4.98  
No. 5030—Extra 25 yd. Skein of Thread \$1.59

## FAMOUS EPISCOPÉ HOME THEATRE

PROJECTS PHOTOS, PRINTS,  
COINS, LIVE INSECTS IN  
NATURAL COLOR AND  
TRUE TO LIFE ACTION!



Ideal for Students, Teachers, Artists  
Hobbyists and hours of Family Fun!!!

This BRAND-NEW EPISCOPÉ PROJECTOR projects directly from snapshots, books, even solid objects like coins, mineral specimens, etc. Fine reflector and mirror system. Hi-intensity projection lens that enlarges images up to 16 feet square! Rugged two-tone body and base with cooling vents and "on-off" switch.

No. 4500—Episcopo Projector... \$15.95

## POWERFUL CO<sub>2</sub> PISTOL

FIRES 100 SHOTS WITHOUT RELOADING!



A semi-automatic, rapid-fire CO<sub>2</sub> BB Pistol that fires 100 shots as fast as you can pull the trigger! Pistol is man-size — 10½" long in handsome gun-metal finish with checkered non-slip target grips. Looks like a real automatic! Perfect for target shooting, pests, proper gun training for youngsters. Comes with BBs and CO<sub>2</sub> cylinder — ready to shoot. (Not sold in N.Y., N.J. or Calif.)

No. 2077—Automatic BB Pistol... \$32.95  
No. 2077A—Special Holster for above... 4.95

**Foster-Trent**  
2345 Post Road, Dept. 522L, Larchmont, N.Y. 10538

RUSH the items ordered below on 30 DAY TRIAL — complete satisfaction GUARANTEED or my money back promptly (except postage & handling). My payment is enclosed including 1.35 for postage & handling. (Sorry! No C.O.D.)

QUAN.	SIZE	ITEM NO.	DESCRIPTION	PRICE
Shipping & Handling				1.35
N.Y. State customers please add sales tax				
Total Enclosed				

Please use Street Address and Apt. No. for FASTER U.P.S. Delivery!  
Print Name \_\_\_\_\_ Apt. No. \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_  
State \_\_\_\_\_ Zip Code \_\_\_\_\_





**YOU MIGHT SAVE \$2.00 TODAY BUYING AN  
OFF BRAND VALVE COVER GASKET...  
AT 3,500 MILES IT COULD COST YOU A BUNDLE!**

The money you might save buying an off-brand gasket now, could cost you a bundle in as little as 3,500 miles... in lost oil and possible engine damage. Look for the Blue Stripes on FEL-PRO Valve Cover Gaskets. Your assurance of superiority.

#### FEL-PRO BLUE STRIPE VALVE COVER GASKETS:

- Made from high-quality materials for a better seal
- Free of voids (holes) that allow oil leakage
- Excellent flexibility, won't break in handling.

Do the job right, do it once—buy where FEL-PRO quality sealing products are sold.

**FREE!** "Get the complete story from the #1 gasket manufacturer on how the value of brand name gaskets benefits you".

**MAIL TO: FEL-PRO INCORPORATED**

7450 N. McCormick Blvd., Box C 1103, Dept. No. PM-1083, Skokie, IL 60076

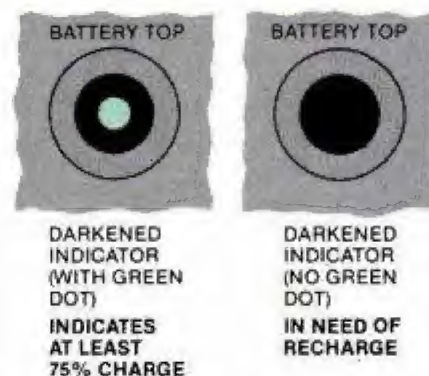
Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

## BATTERY

(Continued from page 134)

ing the voltage test, bring it to full charge with a trickle charger and try it again. You may not be able to bring a maintenance-free battery to full charge with a trickle charger. Some maintenance-free batteries require a sustained, high amperage charge that can only be done on professional charging equipment.

Once your battery is fully charged and passes the voltage test, drive the vehicle for a few days and repeat the voltage test. If the battery won't hold the charge under normal operating condi-



*Hydrometer "eye" on some batteries shows state of charge. A color dot (usually green) indicates an adequate charge. No dot means that a recharge is needed. A light-colored eye means battery is shot.*

## THE MOST USEFUL MEASURING TOOL EVER INVENTED.



**MORE HELP!  
FROM MOTORMITE.**  
MOTORMITE MANUFACTURING  
2695 Philmont Ave.  
Huntington Valley, PA 19006

## AUTOMOTIVE PRODUCTS BY

**Flare**

You've read  
about it!

**NOW  
YOU CAN  
GET IT!!**

**SATISFACTION  
GUARANTEED**



- Designed for drum and disc brake systems
- DOT 5 Motor Vehicle Brake Fluid Conforms to Federal Motor Vehicle Safety Standard No. 118
- Will not absorb moisture
- Stable over 500°F.
- Flows at all temperatures (above -60°F.)
- Protects metal and rubber components
- Safe on painted surfaces
- Mixes with all Dot 3 and Dot 4 Brake Fluid

#### SHIP IMMEDIATELY

12 oz. Silicone Brake Fluid @ \$8.98 ea. Shipping & Handling included. Check or money order, please. No COD's. Ill. Residents add 5 1/4% sales tax (.47 ea.)

NAME \_\_\_\_\_  
Print Clearly

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_ ZIP \_\_\_\_\_

**FLARE BRAKE FLUID**  
411 N. Wolcott Ave., Chicago, IL 60622

tions, but passes the cranking voltage test once it is fully recharged, either your charging system is defective or there is an accessory current drain sapping battery power. A battery that passes the voltage test should be okay.

A hydrometer test can help confirm that a conventional battery is okay. Inexpensive battery hydrometers that indicate approximate state of charge are available at auto parts stores. But don't rely on a hydrometer reading without a cranking voltage test.

If you suspect that your battery is defective, make sure that a charging system problem hasn't contributed to its demise. If testing suggests that the battery is incapable of holding a charge, but you don't want to attempt a test of alternator and regulator condition, you may want to purchase a battery from a mass merchandiser or independent mechanic who offers free amp and full-field testing of the alternator with every purchase. Ask. You might be surprised to find that your mechanic routinely performs this service with the purchase of a battery.

**PM**



# WORTH WRITING FOR

LOOKING FOR IDEAS ON CAR CARE, TOOLS, HOME IMPROVEMENT & MORE? CHECK THESE LISTINGS. THEN USE THE COUPON BELOW.

## 764 Cool in Summer, Warm in Winter

Northern Petrochemical offers a 12-page guide to your cooling system. Information on the composition of anti-freeze/coolant, as well as maintenance of the cooling system. Free

## 765 Meter Monitors

Auto Meter, manufacturer of race car instrumentation, has available a 14-page brochure. Displays their complete line of professional instruments, as well as gauges for street driven vehicles. Monitor performance and economy for prolonged engine life. 50¢

## 766 Stop Vehicle Hesitation

The new patented Reg-Rite valve from Sun Ray can control engine hesitation, surging and ping. Simple installation. Information package. \$1.00 refundable with purchase.

## 767 Unfoillable Oil

Quaker State offers an information booklet to help you select the right automotive motor oil. Explains how different operating conditions and driving situations require different motor oils. Free

## 768 European Class Trucks

Iveco would like you to know what European design and over 70 years of truck building experience has done to make their diesel trucks unique. Engineered for space, fuel and driver efficiency. 12-page, full-color brochure. Free

## 769 Keeping Diesels Happy

Tips on keeping your diesel car, pick-up or van in tip-top running condition. Describes diesel operation and proper fuel and lubrication selection. From Kendall. Free

## 770 Car Care . . . At Your Fingertips

If you drive a car, you need POPULAR MECHANICS' Master Keys To Car Care. This information-packed series of illustrated brochures contains step-by-step instructions to help you maintain your car and keep it looking like new. Convenient-size makes this valuable guide the handiest tool in your car care kit. \$5.45

## 771 Terrain Traveler

The Rokon Ranger is an all terrain vehicle with both front and rear wheel drive. Features a weather-proof Chrysler 10-hp engine and automatic transmission. These vehicles can haul 600 lbs. and range up to 500 miles on one fuel loading. Free brochure.

## 772 Radiator Repair

The Barbee Company offers a 32-page catalog covering radiator repair equipment, supplies, tools and chemicals, plus information on their training school. Free

## 773 Measure Up

Handy pocket measuring guide to solve all those everyday measuring problems. Includes decimals, drill sizes, metric conversion, liquids, troy weight and much more. R&B, Inc. 75¢

## 774 Resilient Flooring

24-page illustrated booklet gives helpful advice on shopping for modern vinyl floors. Information on no-wax surfaces, cushioning, installation and upkeep. Plus, how to decorate and important questions to ask the salesperson. From Armstrong. Free

## 775 Insulation Information

John-Manville's 12-page, color booklet can help you make the job of insulating your home an easy one. Includes information on choosing, measuring and installing fiberglass insulation. Also explains importance of R-values. Free

## 776 Fun and Fitness

112-page, illustrated brochure on the DP Olympac. Complete home fitness center that allows you to perform over 50 different exercises. Includes their full line of exercise equipment, games and other sporting equipment. From Diversified Products. Free

## 777 Facts About Faucets

Get the facts about faucets from American Standard. Full-color brochure tells you about single and dual control faucets for kitchen and bath. Do-it-yourself installation. Free

## 778 Window Works

Replacing windows may not always be the answer . . . fix them! Find out how in this illustrated brochure which describes several replacement products for making old windows work like new. From Quaker City Manufacturing. Free

## 779 Cool Your Air-Conditioner

Mist-Mizer is a product that can help minimize your air-conditioning costs. Works on a thermostatically controlled water "misting" system. Reduces condenser temperature producing colder air and less humidity. Brochure from Faxon Research and Mfg. Free

## 780 Applying The Right Pressure

40-page catalog illustrates and describes clamps for every possible use. Specifications and working advantages are discussed. From Adjustable Clamp Company. Free

## 781 Introducing . . . Latest Tools

New Products Catalog contains the latest in hand tools and electrical connectors from Vaco Products. Over 150 unique, new products are included in this full-color, 32-page catalog. 25¢

## 782 Let the Sunshine In

Sun System's 24-page, full-color catalog can help you choose the prefabricated solar greenhouse best suited to your needs. Discusses energy savings, tax credits and installation. \$1.00

## 783 Paul Bunyon Never Had It So Good!

Build your own hydraulic log splitter. It exerts 10,000 pounds of pressure and splits easily 2-foot logs up to 14" thick. A great way to beat energy costs. Complete plans from POPULAR MECHANICS Project Library. \$8.95

Popular Mechanics 10/83  
Box 1718, Sandusky, Ohio 44870

Please see that I receive the items checked below

- |                                     |                                     |                                  |                              |
|-------------------------------------|-------------------------------------|----------------------------------|------------------------------|
| <input type="checkbox"/> 764        | <input type="checkbox"/> 768        | <input type="checkbox"/> 772     | <input type="checkbox"/> 776 |
| <input type="checkbox"/> 765 50¢    | <input type="checkbox"/> 769        | <input type="checkbox"/> 773 75¢ | <input type="checkbox"/> 777 |
| <input type="checkbox"/> 766 \$1.00 | <input type="checkbox"/> 770 \$5.45 | <input type="checkbox"/> 774     | <input type="checkbox"/> 778 |
| <input type="checkbox"/> 767        | <input type="checkbox"/> 771        | <input type="checkbox"/> 775     | <input type="checkbox"/> 779 |

- |                                     |                                 |           |
|-------------------------------------|---------------------------------|-----------|
| <input type="checkbox"/> 780        | Total money for priced items \$ | _____     |
| <input type="checkbox"/> 781 25¢    | Service Charge \$               | _____ .50 |
| <input type="checkbox"/> 782 \$1.00 | Total money enclosed \$         | _____     |
| <input type="checkbox"/> 783 \$8.95 | Total items requested           | _____     |

Name (Please Print) \_\_\_\_\_

Address \_\_\_\_\_

Town \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

(Please send cash, check or money order made out to POPULAR MECHANICS. No stamps, please.)

**Note:** Popular Mechanics processes your requests for the above information and forwards these inquiries to the organization making the offer. Each company mails the material directly. Your order will be on its way to you within 90 days.



## SECTION FIVE

# SUSPENSION

**M**any motorists tend to ignore the parts of their cars that they can't see and those for which there are no specific service intervals, such as steering and suspension components. This is unfortunate, because a car with worn chassis components is dangerous. An annual examination of these parts is absolutely necessary. And, because wet, icy roads can aggravate handling problems, the last days of autumn are a perfect time for a checkup.

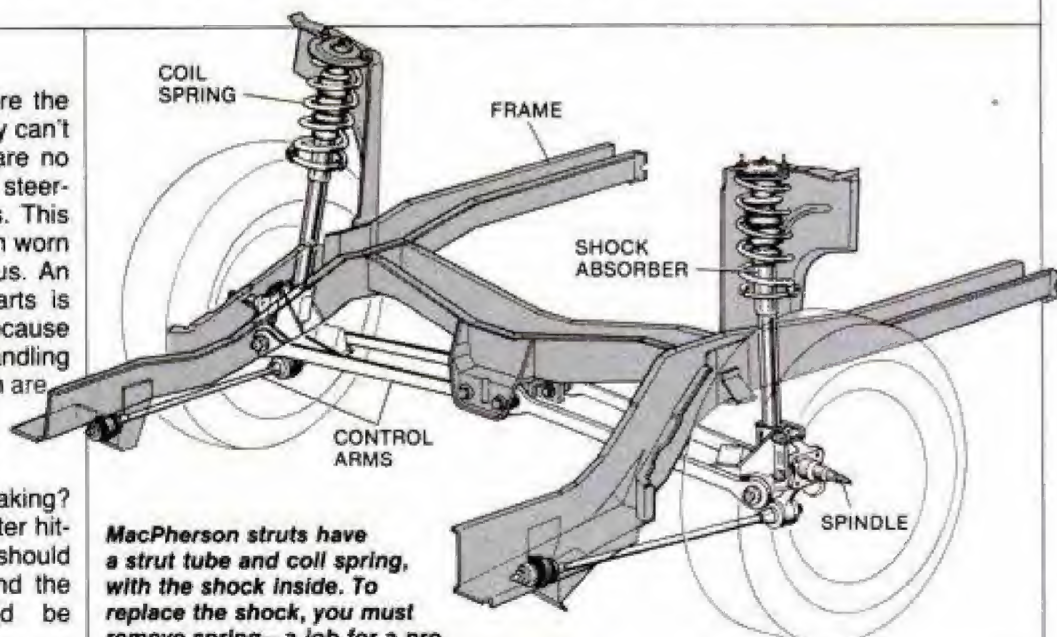
Begin the chassis inspection of any car with a road test. Does the car dive excessively on braking? Does it bounce uncontrollably after hitting a bump in the road? It should rebound firmly and smoothly and the suspension oscillations should be damped by the shocks or struts.

If you suspect that the shocks or struts are not damping wheel movement, follow up your road test with a bounce test. Simply push down firmly and quickly on each corner of the car and watch how it rebounds. It should return to the original position without bouncing back down repeatedly. If it bounces up and down, the shocks or strut cartridges are not providing enough suspension damping and should be replaced.

If your car is equipped with conventional springs and shocks (as opposed to struts), you should check ride height. This will tell you how much your springs have sagged. You can find ride-height specs in an auto repair manual.

Consider the ride-height checking procedure for a mid-sized GM car, as an example. The manual explains that the front ride height is checked by measuring the distance from the center of the lower control arm bushing to the ground and from the lower inboard edge of the ball joint seat to the ground. The second measurement is subtracted from the first, leaving you with a number that is indicative of how far the car has sunk on its springs. If the number is less than the specification, the springs have sagged and should be replaced.

The rear ride height of this particular

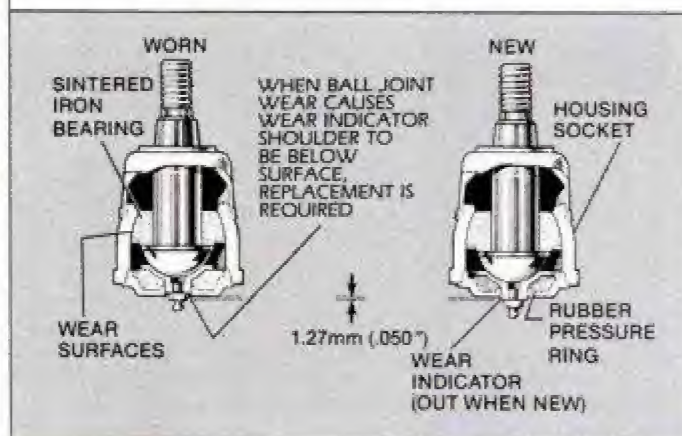


car is checked by measuring from the jounce-bumper's upper attaching bolt to the top of the axle housing. (As the springs sag, the rear axle housing is pushed up closer and closer to the jounce bumper.) Again, if the measurement is less than specified, the springs are worn and should be replaced. Leaf springs can be re-arched by a spring specialty shop, but sagging coil springs cannot be repaired.

On cars with MacPherson struts, examine each strut for signs of leakage. Some struts may weep a slight amount

of oil over a period of time. This would be evidenced by an accumulation of dirt and a slight oiliness under the dirt. However, if the strut is wet with oil or completely coated with oil, the strut must be replaced. Check also for loose or damaged struts. If the tube is seriously dented or the strut rod bent, the strut must be replaced.

Check the tires for uneven or excessive tire wear. If the tires are not wearing properly, the strut or strut tower may have bent or shifted in some way. Have the wheel alignment checked. On some



Some post-'73 cars have a wear indicator on the ball joints. These cars have a collar or shoulder around the grease fitting. When the joint is new, the shoulder sticks out below the bottom of the socket housing. As the joint wears, the shoulder retreats into the housing.





## IF TRAFFIC IS TORTURE ON YOU, IMAGINE WHAT IT'S DOING TO YOUR ENGINE.

These days, it's murder out there on your engine. Driving is rougher, traffic is tougher, and your engine is running hotter than ever.

That's why you need a motor oil that's built to take the heat. You need Gulfpride®. The oil that contains an extreme pressure additive that protects your engine even under the most severe driving conditions.

The special ingredient in Gulfpride coats critical engine parts with multiple layers of protection. To cool the heat and prevent engine friction, even in the worst stop-and-go traffic.

So the next time you change your oil, change to the oil that can take a lot of torture.

Today's Gulfpride.  
It's tough in traffic.



Now you can get a \$2.00 rebate with 5 quarts of any grade. For details, look for Gulfpride displays at participating retailers.





## SUSPENSION

cars, the strut mount can be adjusted to change alignment angles. On other cars, the strut tower must be pushed back to its original location with frame-straightening equipment.

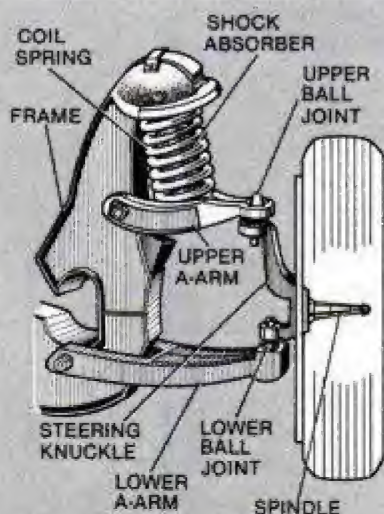
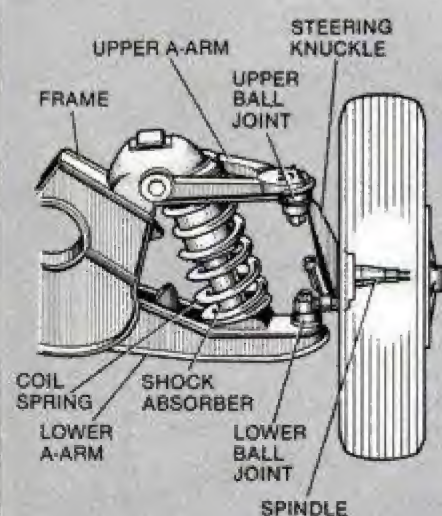
Jack up the front of your car and secure it on jack stands to check tie rod ends, steering arms and ball joints. Make sure the car is in PARK with the emergency brake set and the rear wheels chocked. On cars with coil springs, check the ball joint on the control arm (A-arm) where the spring is mounted. This is the load-carrying joint, and, unless it was replaced previously without replacing the other joint, it should be the first one to wear out.

If the load-carrying joint is on the lower control arm, lift the control arm with a jack until the wheel is in its normal position. Insert a pry bar under the wheel and attempt to move it up and down. There should be virtually no visible movement. One chassis parts manu-

Some cars produced after 1973 are equipped with wear indicator ball joints as standard equipment. Wear indicator joints have a shoulder around the grease fitting that protrudes from the lower surface of the joint. As the joint wears, this shoulder sinks below the surface of the joint, indicating that replacement is necessary.

The checking of tie-rod ends, Pitman arms and idler arms is pretty much a judgment call. You can check steering components by blocking the front wheels in such a way that they can't move from side to side. Then have an assistant turn the steering wheel while you watch the steering linkage for movement at each joint. Or you can just grab the tie rods and shake them vigorously.

If you push hard enough, you can induce movement in any tie-rod end. However, all tie-rod ends should be preloaded. The stud should not move freely in the socket. Look for damaged



On conventional coil spring suspensions, the shock absorber can be removed easily from within the coil spring by taking out a few mounting nuts or bolts.

facturer suggests that there should be less than 0.050-inch of movement. Replace both load-carrying joints if either is loose. Check the unloaded joints if the loaded joints were worn. There should be no visible movement.

If the load-carrying joint is on the upper control arm, relieve the load by wedging a block of wood between the control arm and the frame before jacking the car. Lift the car just to the point where the wheels leave the ground. Check for ball-joint movement without crawling under the car. Noticeable movement is reason for replacement.

or missing rubber boots on tie rod ends.

Inspect control arm bushings for signs of rubber deterioration. Check that the rubber has not ripped away from the center or outside of the bushing. Any sloppiness or excess play in the bushings means replacement.

Most cars have a sway bar to prevent body roll. Some cars have them both in front and at the rear. The bar will be mounted to two of the front control arms or to the ends of the rear axle on support links, and will be mounted in bushings on the frame. Check the bushings and support links for deterioration. **PM**



### ESCORT WINS AGAIN!

JULY 1983 BMWCCA ROUNDEL TEST

"...the filter (ST/O/P) ESCORT is simply outstanding. ...unit decreased non-police alerts by over 90%. ...a price far below that of many other detector units. The ESCORT simply keeps getting better."

### ESCORT WINS

MAY 1983 CAR and DRIVER TEST

"The Escort looks so comfortable, contented, and familiar at the top of the heap that it's hard to see that something new and special has been added... live with a new Escort for a while and you'll realize it has advanced new circuitry that should go down as a genuine breakthrough."

### ESCORT WINS

NOV 1982 CAR and DRIVER TEST

"The Escort, a perennial favorite of these black-box comparisons, is still the best radar detector money can buy. The Escort is a quality piece of hardware."

### ESCORT WINS

DEC 1981 BMWCCA ROUNDEL TEST

"The Escort is a highly sophisticated and sensitive detector that has been steadily improved over the years... In terms of what all it does, nothing else comes close."

### ESCORT WINS

SEPT 1980 CAR and DRIVER TEST

"Ranked according to performance, the Escort is first choice... The Escort boasts the most careful and clever planning, the most pleasing packaging, and the most solid construction of the lot."

### ESCORT WINS

MAY 1980 BMWCCA ROUNDEL TEST

"This unit... consistently outperformed the other products and is the standard to which the others are compared. If you want the best, this is it. There is nothing else like it."

### ESCORT WINS

FEB 1979 CAR and DRIVER TEST

"Only one model, the Escort, truly stood out from the rest... once you try the Escort, all the rest seem a bit primitive. In no test did any of the other detectors even come close."

### Talkback with Jerry Galvin

Time in: America's New Weekly Satellite Call-In Comedy Talk Show. "Mr. Galvin is a master... his show is so unusual that people actually set aside time to listen..." (The Wall Street Journal) Sunday evenings on public radio stations. Check local listings.





**ST/O/P**

**THE  
FIRST  
RADAR  
DETECTION  
ADVANCE  
SINCE  
SUPERHETERODYNE**

# ESCORT: "A GENUINE BREAKTHROUGH"

—CAR and DRIVER

If you keep up with magazine tests, you know that ESCORT does more than just outperform other radar detectors. In its most recent evaluation, Car and Driver concluded: "The Escort radar detector is clearly the leader in the field in value, customer service, and performance..." But performance, as measured by warning distance, is *not* the new breakthrough. After all, ESCORT has been beating all comers since its introduction in 1978.

## Now There's More To It

While long detection range is obviously essential it does *nothing* to solve a problem that has cropped up in the last year. In fact, increasing range by itself just makes the problem worse. If you already have a good superheterodyne unit, you know what we mean. A new generation of imported detector *transmits* radar signals, and can set off your unit as far as a mile away. The longer the range of your unit, the farther away you find them. As Car and Driver pointed out last November: "Since there are far more detectors on the road than police radar units, interference... could become a genuine nuisance."

## Low Level Contamination

At first it was just an irritation. At least ESCORT owners had a way of distinguishing the polluters from the real thing. Our unique audio warning differentiates between the two police radar bands: it "beeps" for X band and "braps" for K band. The polluters' trashy signals triggered both warnings at once, and made a new sound—different than the sounds for police radar. (The rest of the industry didn't even know there was a new problem. Their detectors were making the same sounds as always, just more often.)

## Radar Epidemic

As more and more of the "polluting detectors" hit the streets, the problem became more serious. If one of the "polluters" is approaching in an oncoming lane, the alarm from your detector is brief. But if it's traveling the same direction as you, your alarm can go on for miles. And the offending detector doesn't have to be in the car right next to yours. It can be ahead or behind, and up to a mile away. A very serious problem indeed.

## Pollution Clean-Up

The problem required an entirely new approach. Examining the interference from these imports, our engineers discovered a subtle difference between their signals and those of police radar, even though they were on the same frequency. The solution, then, was to design new circuitry that would reject the pollution while—and this was the hard part—maintaining ESCORT's industry-leading response to pulsed and instant-on radar. We named it ST/O/P™ (Statistical Operations Processor), and it consists of a CMOS digital processor with built-in memory. ST/O/P is not simple, and it's not cheap. But it is, in our opinion, the most important breakthrough in radar detection since superheterodyne. Car and Driver would seem to agree: "Now, all the world's Radio Shack detectors can hum right by your car in full microwave broadcast mode and your Escort will sit on your dash as politely and silently as a canary-fed cat."



**THE RADAR  
DEFENSE  
KIT**

## Peace of Mind

With ST/O/P, we've put the complications necessary to cope with today's radar problems inside—where they work automatically. Just install ESCORT, plug it into your cigar lighter, and turn it on. ESCORT does the rest. If you encounter a signal from a "polluting detector," ESCORT keeps quiet while maintaining its lookout for police radar. If the signal is the real thing, ESCORT immediately alerts you both audibly and visually. And, unlike other detectors that keep you guessing about the radar's location, ESCORT's signal-strength meter moves upscale as you approach and its variable-rate beeper/brapper pulses faster. You get the full story.

## It's Simple

If you want the best, there's no reason to look anywhere else. But don't take our word for it. Try ESCORT *at no risk*. Open the box, install ESCORT on your dash or visor, and take 30 days to test it. If you're not absolutely satisfied, we'll refund your purchase *and* pay for the postage costs to return it. You can't lose. ESCORT is sold factory direct, so knowledgeable support and professional service are only a phone call or parcel delivery away. And we back ESCORT with a full one year limited warranty. Order today and let ESCORT change radar for you forever.

## Do It Today

It's easy to order an ESCORT, by mail or by phone.

**By Phone:** Call us toll free. A member of our sales staff will be glad to answer any questions and take your order. (Please have your Visa or MasterCard at hand when you call).

**CALL TOLL FREE... 800-543-1608**  
**IN OHIO CALL... 800-582-2696**

**By Mail:** We'll need to know your name and street address, daytime phone number, and how many ESCORTs you want. Please enclose a check, money order, or the card number and expiration date from your Visa or MasterCard.



**ESCORT (Includes Everything)... \$245.00**  
Ohio residents add \$13.48 sales tax.

## Speedy Delivery

If you order with a bank check, money order, credit card, or wire transfer, your order is processed for shipment immediately. Personal or company checks require an additional 18 days.

**ESCORT®**  
**RADAR WARNING RECEIVER**

Cincinnati Microwave  
Department 1068  
One Microwave Plaza  
Cincinnati, Ohio 45242-9502

## FOR ESCORT OWNERS ONLY

The new ST/O/P technology incorporated in all new ESCORTs is adaptable to all ESCORTs from serial number 200,000 to 399,999. The "ST/O/P Retrofit" costs \$75, and includes adding the ST/O/P digital circuitry with memory and totally retuning and realigning the unit. The ESCORT's one year limited warranty will also be extended to a date one year after the conversion, and of course the shipping costs to return the unit to you are included.

To insure efficient and prompt service, we will use a special reservation system for scheduling the "ST/O/P Retrofit" service. **DO NOT SEND YOUR ESCORT**, but please send a card or letter (no phone calls, please) with your name, address, and serial number to the following special processing address:  
**ST/O/P Reservations, P.O. Box 228, Mason, Ohio 45040.** We will then send you a special shipping label and details on how and when you can send us your ESCORT.



## SECTION SIX

# TIRES AND WHEELS

**A** good set of tires is obviously essential to safe winter driving. The driving wheels, front or rear, must provide adequate traction to keep you going on slippery or snow-packed surfaces, but don't neglect to check the other two tires, as well.

On a front-wheel-drive car, worn rear tires can contribute greatly to oversteer on turns (the rear slides out). On rear-drive cars, worn front tires can contribute to understeer (the car forges ahead rather than responding to steering control). Both can lead to serious handling problems.

For the driving wheels, there is the problem of choosing between snow tires and all-season radials. And within these categories there are a multitude of types available.

All-season radials, with their aggressive tread patterns, should suffice in areas where snow accumulation doesn't exceed a few inches and where roads remain dry much of the time. Some all-season radials are much more effective than others, so stick with a top-line tire maker.

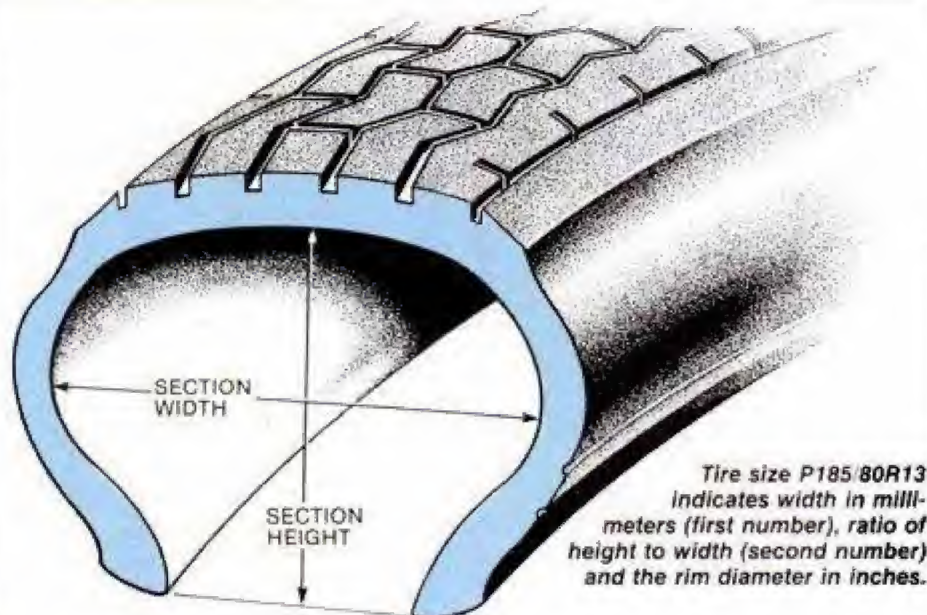
If you live in a heavy snow area, you may opt for snow tires on the driven wheels. Some makers of front-drive cars recommend mounting snow tires on all four wheels; check your owner's manual for advice.

The main rule in choosing snow tires is to avoid mixing bias-ply tires with radial tires. This can cause unusual handling characteristics.

If road-icing or snow-packing is a particular problem, you may want studded snow tires, providing, of course, that they're legal in your area.

Replacement tires should be of the same size, load range and construction as those originally on the car. Once you start swapping sizes or types, the vehicle's handling, speedometer calibration, ground clearance, or tire/body clearance may change. Tires should always be replaced in pairs.

When new tires are mounted, the wheels should always be checked for damage. Make sure none of them are



bent or dented, and examine the lug nut holes for elongation. Check the wheel carefully for corrosion, particularly where the wheel center and rim join.

Most vehicle manufacturers recommend that wheels be checked for runout when new tires are mounted. GM indicates that wheel runout should not exceed 0.045-inch, when measured near the edge of the wheel with the dial indicator parallel to the vehicle's spindle or axle and perpendicular to the wheel. (Obviously, you can't get an accurate reading unless the wheel is clean and smooth.) Runout should not exceed 0.025-inch when measured on the surface of the wheel that is parallel to the ground, with the indicator mounted parallel to the wheel and perpendicular to the axle or spindle.

Mounting and demounting snow tires twice a year is not only expensive, but it can chew up the beads and ruin a tire before its time. An extra set of wheels for your snow tires can pay for themselves in a few seasons. You can often buy sound wheels from wrecking yards for half the price of new ones—just make sure you inspect them carefully for rust or damage.

You can do a lot to improve the way your car handles on dry, snowy or wet pavement if you check tire pressures once a month and adjust them to the level recommended by the vehicle manufacturer. Check the tires cold, unless the manufacturer indicates otherwise. Pressure will increase as much as 6 p.s.i. as the tires heat up.

Most experts feel that underinflating tires will do little to improve traction, even in deep snow. And, when you cross from snowy roads to dry, the loss of handling and dangerous heat buildup will more than offset any return you may gain in traction.

Both full and partial chains are extreme measures and should only be installed when a car has to be moved through extremely deep snow. Don't drive on dry roads with chains; you'll beat your car to death.

Plain steel-link chains are cheap, but they wear through quickly. Lug-reinforced chains have cleats welded to the links that meet the road. These lugs provide better traction and longer wear. European-style chains have a criss-cross pattern that provides excellent traction, but they are expensive. **PM**

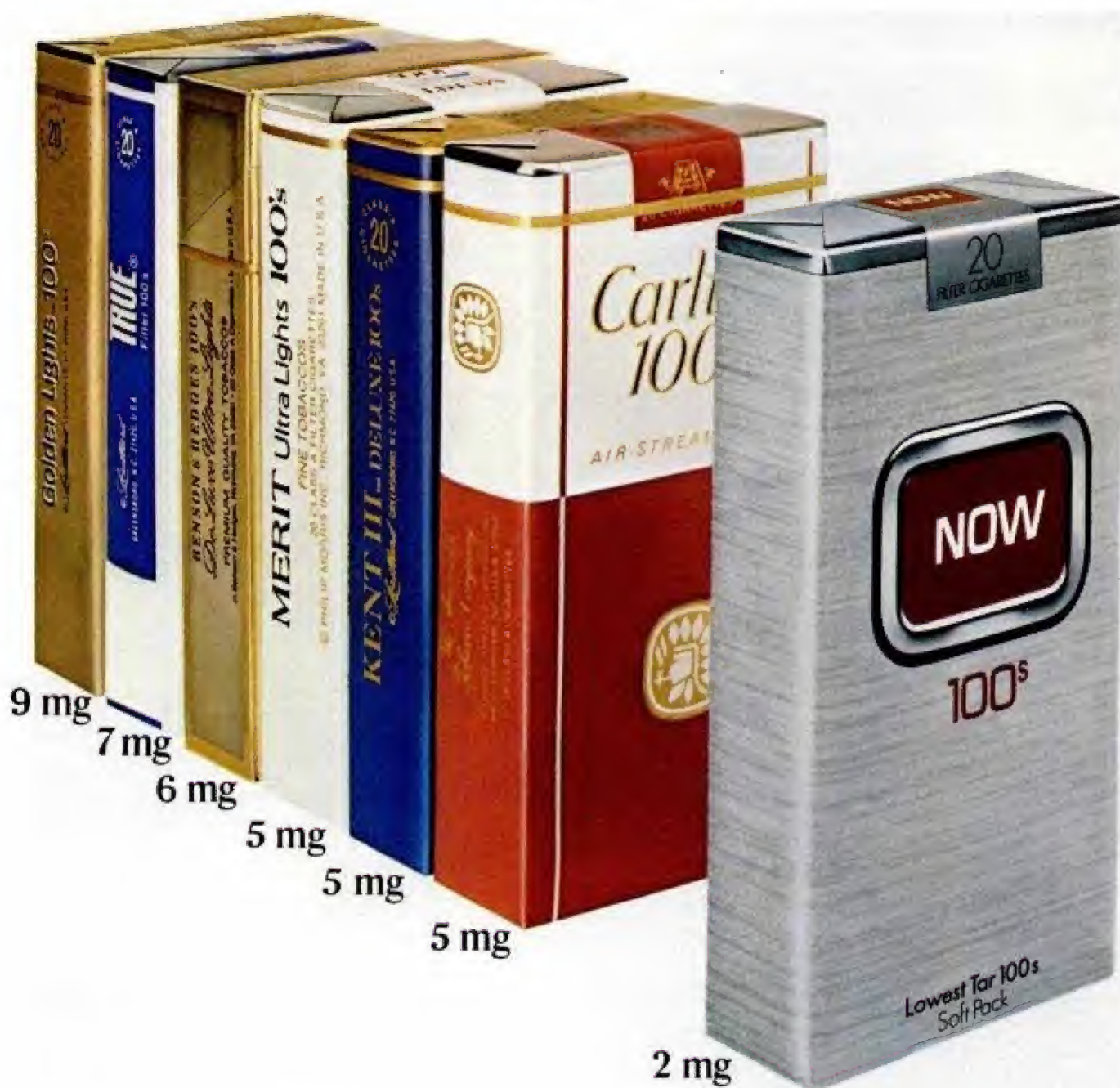


Warning: The Surgeon General Has Determined  
That Cigarette Smoking Is Dangerous to Your Health.

SOFT PACK 100s FILTER, MENTHOL: 2 mg. "tar", 0.2 mg. nicotine  
av. per cigarette, FTC Report MAR, '83.

Competitive tar levels reflect either the Mar. '83 FTC Report or FTC method.

NOW. THE LOWEST OF ALL BRANDS.



**We promise you less.**

**NOW**

**THE LOWEST**

CONFIRMED BY THE LATEST U.S. GOV'T. REPORT ON TAR



## SECTION SEVEN

# BODY AND PAINT

**P**reparing your car's exterior for winter is particularly important if you plan on keeping the car for more than just a couple of years. Moisture is the enemy. When the weather gets wetter, the danger of metal corrosion and paint damage increases substantially. But you can take steps to reduce the chances of harm.

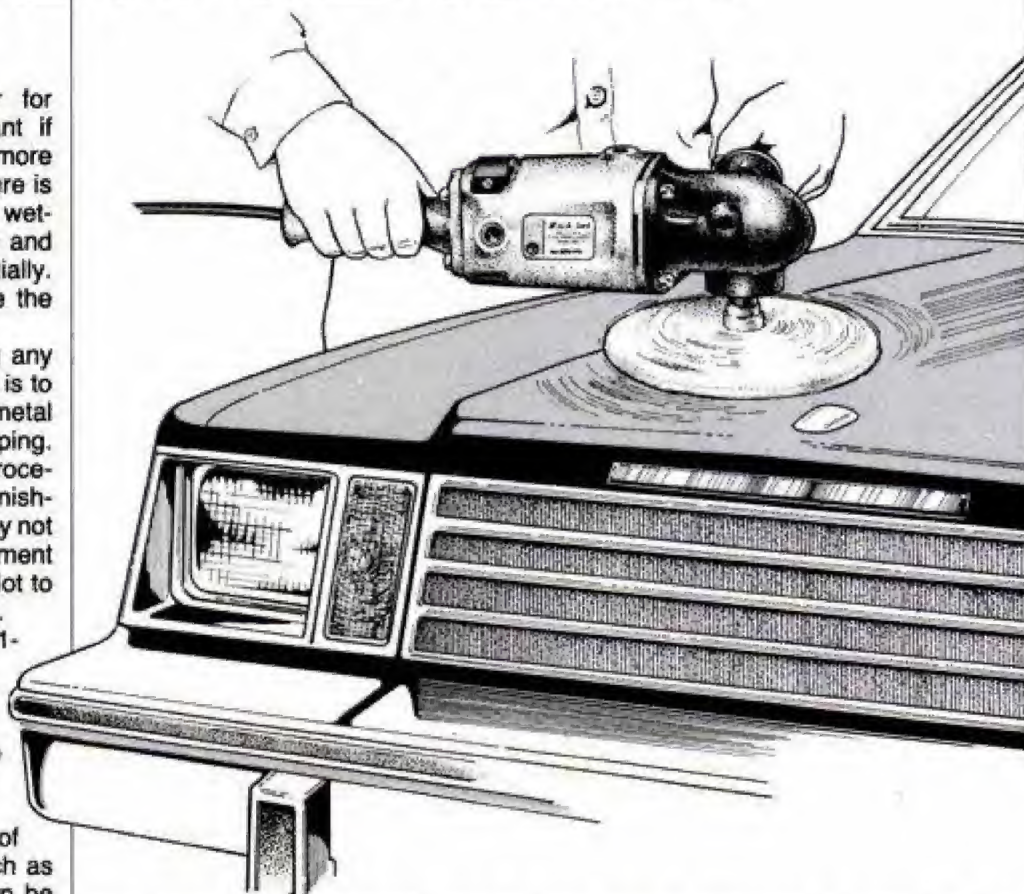
You'll want to begin by treating any rust areas or paint chips. The trick is to remove the rust and coat the bare metal to prevent more rust from developing. We're not going to go into the procedures for repairing rust holes or refinishing panels at this point, and you may not be ready for that much of an investment in time or cash. But you can do a lot to keep the situation from worsening.

On rusted areas of more than 1-inch diameter, where paint has peeled off completely, you'll have to settle for a mismatched repair unless you're prepared to refinish a whole panel or the whole car.

On the other hand, small areas of less than an inch in diameter, such as chips or popped paint blisters, can be touched up fairly well. And, if they're not in conspicuous places, they'll be barely noticeable.

Just take a penknife and carefully scrape any rust from the damaged area. Make sure you get all of the rust, even if you create a depression by doing so. Then purchase a bottle of touch-up paint—if you can find touch-up paint for your car in a bottle. Spray touch-ups are commonly available in auto parts stores and from new car dealers. But the bottled paint is much harder to find. Settle for the spray paint if you can't find the other, but don't attempt to spray it on. It'll stick out like a sore thumb. Instead, after shaking the can very well, spray a little of the paint into the large cap or a paper cup. Allow it to sit for about five minutes or as long as it takes for the paint to thicken a bit, until it's more like the paint that is meant to be applied by brush.

Once the spray paint has thickened,



*To buff out faded old paint and minor scratches, you can rent a polishing machine. But be extremely careful how you use it—any mistakes can burn right through the paint.*

take an ordinary cardboard safety match and dip the torn end in the paint. Dab the paint on the bare spot, taking care not to exceed the boundaries of the damaged area. Lay the paint on fairly thick, but don't keep fooling with it. Do it and leave it alone. Once the paint is dry, the area will be protected, and the edges of the remaining paint will be sealed, preventing additional damage. The car can be waxed or polished after a couple of days, but take it a little easy on repaired areas with abrasive cleaners or polishes.

If your car is coated with road tar or other foreign material that normal cleaning with soap and water won't remove, you can purchase a solvent cleaner from an auto parts store that handles automotive paints. Ask the

counterman for a solvent that is compatible with the finish on your car. Read the instructions that are provided with the product.

Polishing is important both in terms of protecting your car and beautifying it, and the right product will do both.

If your car has only slight scratches and discoloration, you can use a two-part car polish. The first part of this type of product is a blend of solvent and abrasive material that will remove the outer surface of the paint, restoring its color and smoothness. Part two is a sealing wax that will produce a gloss and protect the paint surface from weather and salt. However, these polishes do remove paint and you might rub all the way through to primer if you're not careful.



## BODY AND PAINT

You should use an abrasive polish only if it's needed to remove faded paint, scratches or spots. If scratches are too deep for the abrasive polish, you might try a light sanding with No. 600 wet paper followed up by rubbing compound. However, the danger of rub-through is, of course, even greater with rubbing compound and sandpaper.

A one-component liquid or paste wax with abrasive is designed to do the job of the two-component polish, but, again, rub-through can be a problem. Because these polishes are designed to be fast acting, they may be even more prone to rub-through than the two-part polishes, especially when used with a power buffer.

Finally, there are polishes without abrasive. Many of these are advertised as "cleaner polishes." They contain some type of solvent that will help remove surface film but will not remove a lot of paint. You can tell if a polish contains abrasive material by rubbing some of it between your fingers.

If you want your polishing job to protect the car all winter, rent a polishing machine that runs at 2,000 rpm or faster under load. Polishing with a machine heats the paint and causes a burnishing action. This makes the polish last much longer than a hand-applied coating. However, it's also easier to rub through the finish with a machine. Be careful.

See the label directions on the product you're using to determine what type of polishing pad to use. The most common types are the lamb's wool pad and the carpet-type pad.

While you're polishing the car's finish, don't neglect the brightwork. Check all

the chrome and metal-appearing parts to determine if they're chrome-plated steel, anodized aluminum or bright plastic. Check with a magnet if you're in doubt. Wax aluminum and plastic parts with a nonabrasive car polish. To protect steel bumpers or other conventional chrome-plated steel parts, apply motor oil to the parts, wiping off the excess. Oil will reportedly protect chrome perfectly if applied three or four times a year.

Don't neglect the greasy side of the car either. Check all the undercoating for bare spots. If you find any, clean off the dirt and corrosion and apply new undercoating material. Undercoating is available in spray cans from auto parts stores.

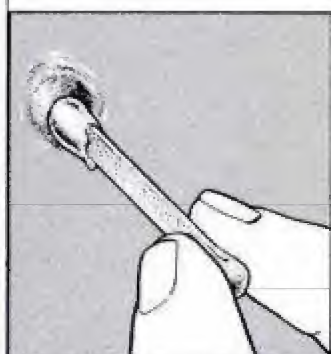
In general, remember that no metal or painted parts of your car should be exposed to bad weather without protection. And don't make the mistake of parking a wet car in a garage. It only speeds up the corrosion process.

Drain holes or tubes are often found on the bottom edges of doors, rocker panels and quarter panels. Some cars have drains on the undersides of the heater housing, cowl, air intake at the base of the windshield and trunk. If the drains are clogged, water will build up and rust will set in.

Use a pipe cleaner or soft wire to gently probe the drains to remove dirt, debris and slush. You must be careful not to scratch the paint.

With a little bit of care, your car can look as nice next spring as it did last summer. **PM**

Use a cardboard matchstick as a brush to touch up minor chips. Hold the match by its head.



## SAVE BIG!



All-Gear  
**MAGNATRAC**  
Crawler  
Tractor  
KIT!



All New  
**YARD  
TRUCK  
KIT!**  
1/3 Ton  
Capacity

Bolt together a **STRUCK-KIT Tractor** in a weekend and pocket Big Savings. Choose our famous **MAGNATRAC Crawler** or our newest 16HP **YARD TRUCK KIT**. Use for odd jobs to earn extra cash. Thousands of **STRUCK-KIT Tractors** in use. 30 Attachments - loader, backhoe, mower, plow, etc. Buy factory direct for greatest savings. Send **NOW** for:

- **CATALOG of KIT construction and uses** — \$1.00 (specify Magnatrac or Yard Truck)
- **ASSEMBLY MANUAL for KIT** — \$7.00 (specify Magnatrac or Yard Truck) Money refundable on any purchase.

**STRUCK-KIT Dept. PM103 Cedarburg, WI 53012**

## Fiendishly ingenious devices!

Free catalog of "Hard-to-Find Tools"

**Brookstone**  
FALL 1983



HARD-TO-FIND TOOLS

Most of the tools you find in a hardware store are of ordinary design, made with ordinary quality, for doing ordinary jobs. Brookstone's famous "Hard-to-Find Tools" are the exception—extraordinary in their craftsmanship and utility...made to do the job right.

saving time, effort and money.

This 68-page catalog may very well be one of the most fascinating you've ever seen. Whether you do home repairs, work in wood, fix clocks, tinkering with cars, build models, or are an all-around do-it-yourselfer, you'll be in your element reading "Hard-to-Find Tools." And everything we sell is **guaranteed for life**.

Send for your free catalog today!

Send me Brookstone's FREE 68-page catalog.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_

**Brookstone**

70 Vose Farm Road, Dept. 870A  
Peterborough, New Hampshire 03458



# RECALLS

Is yours one of the millions of vehicles called back by manufacturers to rectify safety-related problems? If you're not sure, the information in this section could literally be a life saver.

If you find your vehicle listed, call 1-800-424-9393. That's the hot-line number of the National Highway Traffic Safety Administration. Tell them that you think your vehicle may have been recalled. They will send you a card. Answer the questions on it, making sure to supply the vehicle identification number (VIN). Then, mail the card to the manufacturer, who will let you know if the recall applies to your vehicle. If you bought the vehicle used, the manufacturer will also tell you if it was brought back to the dealer by a previous owner to have the repair made.

There is, by law, an eight-year statute of limitations on recalls. In other words, once a recall is announced, the vehicle owner has eight years in which to get repairs made at the expense of the manufacturer. Thereafter, the owner has to pay for them.

## AMC

Year/Units Models Involved	Description of Defect Corrective Action
1982: 23,232 Concord, Eagle, Spirit, Jeep Wag- oneer & Cherokee	Incorrect lubrication of T4 and T5 manual transmission. <i>Install correct EP (extreme pressure) lube.</i>
1982: 15,500 Concord, Eagle, Spirit	Wiring harness may develop short circuit; PCV hose may lie too close to engine hot spot. <i>Install new electric parts; reroute PCV hose.</i>
1981: 1,724 Jeep CJ, Wagoneer, Truck	Improperly installed automatic transmission control rod spring (6-cylinder engine). <i>Repair.</i>
1981: 11,162 Concord, Eagle, Spirit	Cruise command servo chain may keep throttle activated. <i>Install new chain.</i>
1980: 8,000 Concord, Eagle	Incorrect taillamp sockets installed. <i>Replace.</i>
1980: 3,310 Eagle	Front-wheel-drive half-shaft assemblies may fracture. <i>Replace.</i>
1979-80: 10,891 Jeep Wagoneer, Cherokee, J10 Truck	Damaged wheel bearings may exist. <i>Replace left and right bearing assemblies.</i>
1979: 7,700 Concord Wagon	Incorrect tire air pressure placard. <i>Replace.</i>
1979: 1,170 Jeep CJ-5, CJ-7	Incorrect gasket between manual transmission and transfer case. <i>Replace.</i>
1978: 9,850 Pacer	Defective lower control arm ball joint. <i>Replace.</i>
1979: 1,995 Jeep Cherokee, Truck	Additional accelerator control system spring needed. <i>Install.</i>

## CHRYSLER CORP.

Year/Units Models Involved	Description of Defect Corrective Action
1983: 5,234 600, 600ES, Chrysler E-class	Electric arc at electric fuel filler door may ignite fuel vapors. <i>Install solenoid-to-ground wire.</i>
1983: 1,725 Dodge Van, wagon, pickup, Ram-charger, Plymouth Voyager	Vehicle with manual transmission may start with ignition switch in accessory position because of damaged switch. <i>Replace switch.</i>
1983: 50,000 Reliant, 400, 600, Aries, LeBaron, Chrysler E-class	Interference with rear brake tubes. <i>Reroute tubes.</i>

1982: 4,000 LeBaron, Town & Country, Reliant, Horizon, 400, Aries, Omni, Ramcharger	Ball joint-to-steering knuckle bolts may fail. <i>Replace.</i>
1981: 30,000 LeBaron, Cordoba, Newport, New Yorker, Gran Fury, Diplomat, Mirada, St. Regis	Defective bowl vent solenoid may cause flooding and loss of power. <i>Modify solenoid.</i>
1981: 110,000 Aries, Reliant	Defective stop lamp switch may cause inoperative stoplights. <i>Replace switch.</i>
1981: 150,000 LeBaron, Cordoba, Newport, New Yorker, Horizon, Reliant, Gran Fury, Omni, Aries, Diplomat, Mirada, St. Regis, Imperial	Automatic speed control may not deactivate on brake application. <i>Replace speed control switch.</i>
1980: 14,500 Horizon, Omni	Ball joint-to-control arm bolts may fail. <i>Replace.</i>
1980: 25,004 Champ, Sapporo, Colt, Challenger	Overheating ashtray bulb socket may cause fire. <i>Replace socket and wire.</i>
1980: 3,000 B100, B200, B300	Side door hinges may fail. <i>Replace.</i>
1980: 235,000 Omni, Horizon	Hood secondary catch may fail. <i>Modify.</i>
1980: 6,617 Volare, Aspen, LeBaron	Interference with front tires may cause damaged brake hoses. <i>Reposition hoses.</i>
1980: 4,000 Cordoba, Mirada	Exhaust gas may enter car through defective rear fender panel sealing plugs. <i>Install different plugs.</i>
1980: 7,000 Cordoba, Mirada	Defective throttle linkage may cause throttle to stay open. <i>Replace throttle return springs.</i>

## FORD MOTOR CO.

Year/Units Models Involved	Description of Defect Corrective Action
1983: 2,673 Thunderbird, Cougar	Inadequately welded fuel-tank seams. <i>Replace fuel tank.</i>
1983: 36,000 LTD, Fairmont, Ford, Marquis, Zephyr, Grand Marquis, Lincoln Town Car, Continental, Mark VI	Defective transmission control selector-tube retaining clips. <i>Replace clips.</i>
1983: 98,162 Thunderbird, Crown Victoria, LTD, Grand Marquis, Marquis, Cougar, Lincoln Town Car, Continental, Mark VI, Ford light trucks, vans	Defective transmission parking pawl actuating rod cam retainer pins. <i>Replace parking pawl assembly.</i>
1983: 1,102 Ranger 4 x 4	Defective front coil spring assembly studs. <i>Replace.</i>
1983: 2,800 Escort, Lynx	Defective fuel system. <i>Shield and reinforce fuel tank and fuel filler.</i>
1982-83: 2,069 Fairmont, Zephyr	Defective park actuating lever rod springs may exist in C3 automatic transmission. <i>Install new springs.</i>

1982-83: 74,985 Ford	On light trucks and vans, rear axle may disengage. <i>Install lever-locking wedges.</i>
1982: 15,988 Lincoln Continental	Defective fuel filler housing assembly may result in fuel leak. <i>Modify.</i>
1982: 113,000 Escort, EXP, Lynx, LN7	Air conditioning blower motor resistor may overheat and cause fire. <i>Install new resistor.</i>
1982: 4,967 LTD	Incorrect steering column shift lever insulator. <i>Install correct insulator.</i>
1982: 5,200 EXP, LN7	Failure to meet fuel spillage standards. <i>Install new fuel filler and vent pipe.</i>
1982: 3,010 Granada, Cougar	Incorrect tire placard data. <i>Get revised placard from dealer.</i>
1981-82: 245,000 Escort, Lynx station wagons	Weak front upper torso restraint anchorages. <i>Reinforce area.</i>
1981-82: 4,330 Escort, EXP, Lynx, LN7	Improperly assembled power brake booster. <i>Replace booster.</i>
1981-82: 16,500 F-250	Incorrect wheel-lug torque specification given in owner's manual. <i>Get revised page from dealer.</i>
1981: 1,850 Econoline	Incorrect gear position indicator. <i>Install correct indicator.</i>
1981: 21,000 Escort, Lynx	Speed control may activate without warning. <i>Modify.</i>
1981: 112,000 Escort, Lynx	Fuel inlet may not be grounded. <i>Repair.</i>
1981: 6,500 Mustang, Capri	Driver seat back latch may fail. <i>Replace latch/recliner assembly.</i>
1981: 14,000 LTD, Marquis, Mark VI, Lincoln	Malfunctioning neutral start switch. <i>Replace.</i>
1981: 7,000 Escort, Lynx	Misrouted engine compartment wire harness may be damaged and cause fire. <i>Reroute.</i>
1981: 27,000 Escort, Lynx	Improperly tightened rear brake backing plates. <i>Tighten to specification; check rear brake tubes.</i>
1981: 314,000 Ford	Cooling fan blades of 351W-cu.-in. engine with air conditioning may come loose. <i>Replace fan.</i>
1981: 11,500 Escort, Lynx	Metal carpeting fasteners may have penetrated fuel tank. <i>Replace tank.</i>
1981: 6,260 F-100, F-350	Defective fuel tank straps. <i>Relocate and/or tighten.</i>
1981: 18,154 Mercury, Mark VI	Defective electric relay may overheat and cause fire. <i>Replace relay.</i>
1981: 1,500 Fairmont, Zephyr	Missing brake pushrod-to-brake pedal retaining pins. <i>Install pins.</i>
1980-81: 12,500 Ford	On light trucks, spare-tire carrier reinforcement may damage spare tire. <i>Modify.</i>
1980: 8,000 F-series light trucks	Missing exhaust-system heat shields. <i>Install shields.</i>
1980: 13,332 F-series light trucks	Intermediate steering shaft-to-steering column bolt missing or damaged. <i>Install bolt.</i>
1980: 14,500 Mark VI	Damaged accessory feed wire insulation could overheat and cause fire. <i>Repair.</i>
1980: 14,500 F-150 4 x 4	Missing fuel-tank shield. <i>Install shield.</i>
1980: 52,053 Lincoln, Mark VI	Damaged stop lamp switches. <i>Replace.</i>
1980: 8,000 E-, F-series light trucks, Econoline, Club Wagon	Cracked wheels. <i>Replace.</i>



[illegible]

Hardware is all we do. So you won't find empty hooks where products should be. Or empty looks from our clerks when you ask for help.

Sentry. Where fast, helpful service and a wide selection will keep you coming back. That's our idea of a hardware store.



Check the Yellow Pages under Hardware for the Sentry store nearest you. Sentry Hardware Corporation, Cleveland, Ohio 44113. Merchandise shown in this advertisement is available from participating dealers only. Offer expires November 1, 1983. All Sentry dealers run their own stores. They select their merchandise and set their own prices. There may be variations in products, available quantities and prices in individual stores.

**SKIL®**  
8 1/4" Table Saw  
with free Dado Set  
(31022) \$149.99

Drill Bit Set  
Size Gauge  
\$5.99

5 Minute  
Epoxy

17' Brown/V  
V-Seal Weather  
(2100) (2101) \$

V-Seal  
Weather Strip

STANLEY  
50' Tape Measure

**STANLEY®**  
50' Tape Measure  
(34-4508M) \$5.99



## RECALLS

<b>1980: 24,400</b> F-series light trucks	Failure to meet fuel spillage standard. <i>Install fuel-tank shield.</i>
<b>1980: 10,000</b> Econoline, Club Wagon	Improperly made brake hoses. <i>Replace.</i>
<b>1980: 80,000</b> Bronco, Econoline, Club Wagon, F-series trucks	Defective C6 transmission parking pawl actuating rod. <i>Replace actuating rod.</i>
<b>1980: 3,000</b> Fairmont, Thunderbird, XR-7, Zephyr	Wrong rear-brake assemblies. <i>Replace.</i>

### GENERAL MOTORS

Year/Units Models Involved	Description of Defect Corrective Action
<b>1983: 12,721</b> Cavalier, 2000, Skyhawk, Firenza, Cimarron	On 2-liter fuel-injected engine, fuel system may leak at throttle body injection fuel-feed connection. <i>Install new fitting.</i>
<b>1983: 5,316</b> Tornado, Riviera, Eldorado, Seville	Capacitor in windshield wiper system may overheat and cause fire. <i>Remove capacitor.</i>
<b>1982: 15,400</b> Citation, Celebrity, Phoenix, 6000, Skylark, Century	Rear brake hoses fail to conform to standard. <i>Replace.</i>
<b>1982: 79,686</b> Cutlass, Delta 88, 98, Toronado, Seville, Eldorado, DeVille, Regal, LeSabre, Electra, Riviera, Bonneville, Grand Prix, Monte Carlo, Impala, Caprice, Malibu	In vehicles with 5.8-liter V8 diesel engines, governor weight retainer in fuel injection pump may fail, causing throttle to stick open. <i>Replace governor weight retainer.</i>

<b>1982: 4,987</b> Omega, Citation, Phoenix, Skylark	Interference by clutch pedal with master cylinder brake pipe on cars with manual transmission and power brakes. <i>Modify.</i>
<b>1982: 519,329</b> Celebrity, Citation, Cavalier, 6000, Phoenix, J-2000, Cutlass, Ciera, Firenza, Century, Skylark, Skyhawk, Cimarron	Fuel tank filler pipe hose clamps may fracture. <i>Replace clamps.</i>
<b>1982: 24,455</b> Camaro, Z-28, Firebird, Trans Am	Fuel tank of fuel injection engine may spew gas. <i>Replace vent and pressure valves.</i>
<b>1982: 1,167</b> Regal	Fuel-inlet pipe may crack. <i>Replace pipe.</i>
<b>1982: 1,633</b> Chevrolet C10, GMC C15	Rear brake drum balance weights may interfere with aluminum wheels. <i>Modify.</i>
<b>1981: 2,440</b> Century, Regal, El Camino, Caballero, Cutlass	Weak wheels may fracture. <i>Replace wheels.</i>
<b>1981: 105,130</b> Citation, Phoenix, Skylark, Omega	Engine-to-body electric ground cable may be damaged. <i>Install new cable.</i>
<b>1981: 9,070</b> Tornado, Riviera, Eldorado, Seville	Improperly torqued front left upper control arm nuts. <i>Tighten to specification.</i>
<b>1981: 4,615</b> Impala, Caprice, Electra, LeSabre	Wrong brake pedal support bracket installed. <i>Replace.</i>
<b>1981: 25,463</b> Citation, Omega, Skylark, Phoenix	On V6 engine, incorrectly routed power steering hoses. <i>Replace hoses; reroute.</i>

<b>1980-82: 598,387</b> Chevette, T-1000	Carburetor fuel inlet housing plug of 1.6-liter engine may come out, allowing a fuel leak. <i>Install retaining clip.</i>
<b>1980-81: 55,238</b> Monza, Chevette, Camaro, Sunbird, Firebird	Seat belt retractors don't meet standard. <i>Replace.</i>
<b>1980: 287,170</b> Skylark, Citation, Omega, Phoenix	Rear brakes lock under moderate to hard braking. <i>Replace brake proportioning valve.</i>
<b>1980: 18,881</b> Eldorado, Seville	Screws holding shift linkage may fall out. <i>Tighten.</i>
<b>1980: 85,325</b> Camaro, Firebird	Loose lower control arm ball joint-to-steering knuckle attaching nut. <i>Tighten to specification.</i>
<b>1980: 12,362</b> Tornado	EGR wiring harness on diesel engine may become pinched, causing short circuit. <i>Reroute harness.</i>
<b>1980: 24,719</b> Impala, Caprice Classic	Front brake pipe may chafe and spring leak. <i>Reposition pipe.</i>
<b>1980: 2,343</b> Chevrolet P30, GMC P35	Rear brake hose may chafe and spring leak. <i>Reposition hose.</i>
<b>1980: 4,382</b> Omega, Citation, Skylark, Phoenix	Brake pipe may chafe against clutch control cable and spring leak. <i>Reroute cable.</i>
<b>1980: 4,626</b> Omega, Citation, Skylark, Phoenix	Incorrectly positioned fuel hose may rub against front drive axle. <i>Provide clearance.</i>
<b>1980: 10,751</b> Citation, Phoenix	Inadequate welding of rear control arm longitudinal body bars. <i>Weld and bolt bars.</i>
<b>1980: 23,725</b> Omega, Citation, Skylark, Phoenix	Incorrect front coil springs. <i>Replace.</i>



## Kendall Super DSL. The first motor oil formulated exclusively for automobile diesel engines.

Super DSL's diesel-tough friction fighters and rugged anti-thickening agents stand up to higher diesel compression and hotter diesel temperatures while they help your diesel start on cold mornings.

Next time you change oil on your diesel van, pickup or car change to Kendall Super DSL.

Free from Kendall: A pamphlet with tips on diesel maintenance. Write Kendall Refining Co., Bradford, PA 16701, Attn: Advertising Dept.

# Kendall®

KENDALL REFINING CO.  
Div. of Witco Chemical Corporation  
Bradford, PA 16701





## RECALLS

**1980: 161,225**  
Omega, Citation,  
Skyline, Phoenix

Steering gear mounting plate may crack and affect steering response. *Install new mounting bracket.*

**1980: 224,892**  
Omega, Citation,  
Skyline, Phoenix

Automatic transmission fluid may leak through defective cooler hoses and ignite. *Replace hoses.*

**1980: 3,170**  
88, 98, Toronado

Incorrect data on tire placard. *Install new placard.*

**1979-80: 320,677**  
Chevrolet, GMC  
light trucks

Crack may develop in brake booster housing and affect braking. *Replace brake booster.*

**1979-80: 67,350**  
Century Wagon,  
Malibu Wagon,  
Cutlass Wagon,  
LeMans Wagon

Backlites having defoggers may shatter and scatter hot glass. *Modify.*

**1979: 8,534**  
Riviera

Marker lamps may not meet standard. *Replace.*

**1979: 4,208**  
Skyline, Starfire,  
Monza (H-Special),  
Sunbird

Engine oil switch may develop short circuit that could result in engine self-starting. *Replace switch.*

**1979: 15,328**  
Century, Regal,  
LeSabre, Electra,  
Monte Carlo, Impala,  
Caprice, Camaro, Firebird,  
Cutlass, Chevrolet & GMC light trucks

Rear brake stoplights may become inoperative and Cruise Control may stay engaged. *Replace applicable switches.*

**1979: 42,977**  
Skyhawk, Starfire,  
Sunbird, Monza

Fuel hose near EGR valve on 231-cu.-in. V6 engine may chafe and rupture. *Reposition hose.*

**1979: 1,326,404**  
Impala, Caprice, Catalina, Bonneville, 88, 98, LeSabre, Electra, Deville, Fleetwood (also, 1980 88, 98)

Defective front seat belt anchor bolts. *Replace.*

**1979: 15,981**  
LUV 4 x 4 truck

Front suspension upper control arm shaft attaching bolts may loosen, affecting steering and front wheel alignment. *Replace bolts.*

**1978-81: 5,821,160**  
Malibu, Monte Carlo, El Camino, Century, Regal, Cutlass, LeMans, Grand Prix, Caballero (all sedans and wagons)

Lower rear control arm-to-frame bolts may fracture, causing rear control arm to fall. *Install new retainers.*

**1978: 1,896,222**  
Malibu, Monte Carlo, El Camino, LeMans, Grand Prix, Cutlass, Century, Regal, Caballero

High temperature may cause loss of front wheel bearing lubricant, leading to bearing failure. *Install new bearings and seals that are lubricated with high temperature grease.*

**1978: 41,508**  
Seville

Fuel hose connection may deteriorate and leak. *Install new hose and clamp.*

**1978: 22,268**  
Monza, Sunbird, Starfire, Skyhawk, P30 Motor Home

Defective steering intermediate shaft coupling. *Replace.*

**1978: 1,643**  
Malibu, Monte Carlo, LeMans, Grand LeMans, Grand Prix

Head restraints fail to meet standard. *Replace.*

**1978: 333,819**  
Malibu, Monte Carlo, Catalina, Bonneville, LeMans, Firebird, Phoenix, 88, Cutlass, Omega, LeSabre, Electra, Century, Regal, Skyhawk, Sprint

Fan blade spider may fail, causing blades to fly off. *Replace fan.*

**1978: 1,400**  
Impala, Caprice Classic

Front bench seats may fail to lock during an accident. *Install new lock.*

**1978: 5,146**  
DeVille

Windshield washer reservoir may crack and lose fluid. *Replace.*

**1978: 4,504**  
Buick, Cadillac, Chevrolet, Oldsmobile, Pontiac

Defective rear wheel mounting bolts may break and lead to loss of wheel. *Replace.*

**1977-78: 172,000**  
Monza, Sunbird, Starfire

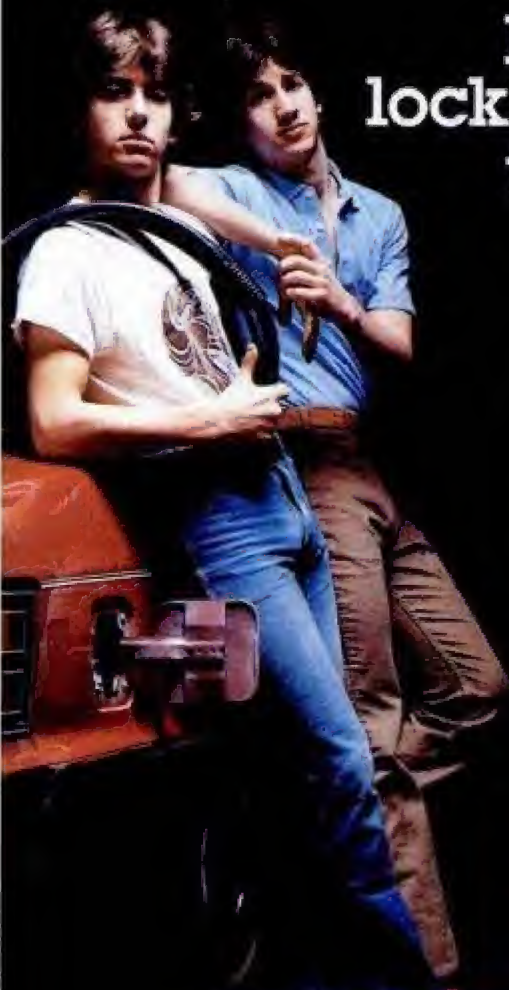
Left engine mount support may deform and lead to difficult steering. *Reinforce mount bracket.*

**1977-78: 372,466**  
DeVille, Brougham

Accelerator pedal extension may wedge and increase engine speed unexpectedly. *Remove extension.*

## HONDA

Year/Units Models Involved	Description of Defect Corrective Action
<b>1977-79: 936,774</b> Civic, CVCC and station wagon, Accord, Prelude (also 1973-76)	Exposure to road salt may eventually cause undercarriage structural failure. <i>Treat undercarriage with rust preventive.</i>
<b>1977: 132,573</b> Civic 1200 (also 1975-76)	Heat emitted from split in muffler may lead to fire. <i>Install shield.</i>
<b>1977: 33,552</b> Civic	Short circuit may cause choke cable to ignite. <i>Modify.</i>



**"If you don't have a Stant® locking gas cap, tell us where you parked your car."**

Some kids like to steal gas out of your gas tank — or worse, put sugar in.

A Stant locking gas cap can protect your car against this kind of vandalism. It's dependable. And it's inexpensive — especially now that you get a \$1 cash rebate from Stant!

Get a Stant locking gas cap today at your local automotive supply store.

It locks gas in.  
It locks vandals out.

**Stant**

Stant Inc., Connersville, IN 47331  
A Purolator Company

**\$1<sup>00</sup> Rebate from Stant**

We'll send you a \$1 cash rebate. Just send in this coupon along with your entire Stant locking gas cap package and dated cash register receipt to: Stant \$1 Cash Rebate Offer, P.O. Box NB409, El Paso, TX 79977 (Canadian residents mail to: Stant \$1 Cash Rebate Offer, P.O. Box 9556, St. John, NB, Canada E2L 4N7).

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Offer void where prohibited, taxed, or otherwise restricted. Offer expires Nov. 15, 1983. Allow 4 to 6 weeks for delivery of rebate. Limit one request per envelope. PM



## RECALLS

### NISSAN (DATSUN)

Year/Units Models Involved	Description of Defect Corrective Action
1982: 18,082 Stanza	Brake pedal height fails to meet standard. <i>Adjust to correct height.</i>
1980-81: 42,735 Pickup truck (4WD)	Mud and water penetrating wheel hubs may cause wheel bearing failure. <i>Install new seals.</i>
1980: 15,019 310	Loose transmission main shaft lock nut may cause difficult shifting. <i>Tighten lock nut to specification.</i>
1979-81: 118,747 510	Defective seat belt assembly. <i>Replace.</i>

1979-80: 72,754  
Hatchback

Defective taillight sockets. *Replace.*

1977-79: 295,  
710  
280Z, 280ZX,  
810 (also 1975-  
76)

Blowby gas may leak and cause electronic fuel injection components to affect engine idling speed. *Install new PCV valve.*

### SUBARU

Year/Units Models Involved	Description of Defect Corrective Action
1981-82: 43,300 All models	Loose steering wheel nut may cause wheel to separate from steering shaft. <i>Tighten to specification.</i>

1981-82: 94,564  
All models

Main wiring harness in models with manual transmission may chafe, short and cause fire. *Modify harness.*

1981: 32,000  
All models

On vehicles equipped with San-kyo fast-idle control device, throttle lever may bind. *Install new throttle lever.*

1980-81 230,041  
All models, ex-  
cept Brat

Headlight fuse holder may fail and cause loss of head lamps. *Replace holder.*

1980: 84,253  
All models, ex-  
cept Brat

Driver's seatback frame may break. *Install new frame.*

1980: 71,683  
All models, ex-  
cept Brat

Defective drive link may lead to loss of windshield wipers. *Install new link.*

1977-79: 106,000  
Station Wagon  
(also 1978 Brat)

Fuel tank may crack because of insufficient venting. *Install new orifice and valve assembly.*

1977-78: 170,000  
All models

Engine may stall in cold weather because of carburetor icing caused by moisture being drawn into the carburetor through the PCV system. *Install new PCV system.*

1977: 42,258  
Station wagons  
(also 1976)

Defective tailgate latch assembly may allow tailgate to fly open. *Install new latch assembly.*

### TOYOTA

Year/Units Models Involved	Description of Defect Corrective Action
1981: 9,171 Cressida	Misrouted wiring harness may not allow seat belt engagement. <i>Reroute and clamp harness.</i>
1980: 98,493 Celica, Corona, Corolla	Alternator pulley may break apart and parts may scatter. <i>Install new pulley.</i>
1979: 85,695 Pickup truck	Vibration at 40-50 mph may cause loss of control. <i>Install steering damper.</i>
1978: 5,700 Corona sedans, station wagons	Defective fuel system pressure relief valve may lead to stalling and hard restarting. <i>Replace valve.</i>
1978: 5,317 HiLux	Fails to meet standard for welds along side panels. <i>Modify with brackets.</i>

### VOLKSWAGEN

Year/Units Models Involved	Description of Defect Corrective Action
1982: 1,770 Pickup truck	Cotter pin to hold rear axle shaft lock nut omitted. <i>Tighten lock nut to specification; install cotter pin.</i>
1981: 5,200 Rabbit, pickup truck	Loose ball joint lock nuts. <i>Tighten nuts to specification.</i>
1981: 7,400 Jetta	On cars equipped with diesel engines, incorrect data on certification labels. <i>Install new labels.</i>
1981: 4,800 Rabbit, pickup truck	Cracked tie rod ends. <i>Replace.</i>
1981: 3,200 Jetta	Incorrect data on tire placard. <i>Replace.</i>
1980-81: 133,000 Rabbit, pickup truck	High fuel tank pressure may allow fuel to spill. <i>Modify fuel filler.</i>
1980-81: 3,200 Dasher	Defective brake calipers may cause loss of brake fluid. <i>Repair.</i>
1980: 2,287 Vanagon	Defective heater exhaust pipe may cause dry material under vehicle to ignite. <i>Modify.</i>
1980: 2,572 Vanagon	Improperly tightened front ball joints. <i>Torque to specification.</i>
1978: 3,000 Rabbit	Vacuum hose between carburetor and thermo valve may prevent throttle return to idle. <i>Replace and clamp vacuum hose.</i>
1978: 18,500 Rabbit, Scirocco	Rubber elbows on pipe from throttle valve to brake power booster may fail, causing loss of brake assist. <i>Replace and clamp elbows.</i>

Stanley gives you a hand  
when you need it most.



Stanley's new  
"Flip Drive"™ Ratchet  
lets you change ratch-  
eting directions with  
one hand.

Around your home, workshop or garage, Stanley's unique Flip Drive ratchet does with one hand what used to take two. Its patented "Flip Drive" feature lets you change ratcheting directions easily, with one quick flip of a

finger. There's no other drive tool like it. And it's part of Stanley's new line of Workmaster™ Sockets and Wrenches.

The Workmaster line delivers the selection you'd expect. All the most needed drive tools, sockets, wrenches and accessories. And a complete line of sets for a wide variety of jobs. All in reusable packages for

convenient home storage. All featuring Stanley quality for years of performance.

Simplifying do-it-yourself projects and repairs is what Stanley does best. The new Flip Drive ratchet and Workmaster line of sockets and wrenches prove it.

**STANLEY**  
helps you do things right.



## JEEP POWER FOR AMC

(Continued from page 114)

er auto manufacturers obtain similar results primarily with complex intake port designs.

### Something old, something new

The AMC Four does keep the water pump and front housing from the 4.2-liter Six, plus connecting rods from the old 232-cu.-in. Six. The rod bearings are an upgrade, and can go on all three engines.

The timing chain is brand new. Sixes are easy on chains, but Fours produce forces that will tear apart anything ordinary. AMC went to England for a super-duty double-roller design, and added an automatic tensioner to provide belt-and-suspenders security.

The AMC Four has a distributor with conventional mechanical and vacuum advance, plus a computer and knock

sensor to compensate for borderline fuel.

Unlike most knock-sensor systems, which just retard spark timing when the engine knocks, this one adds up to 6° advance when the engine is running knock-free. If it hears knock, it starts canceling out the spark advance in 2° steps, and if necessary can plug in up to 12° of spark retard.

### Fast reactions

The computer is wired so it knows which cylinder is firing and can react so quickly it can change timing from one cylinder to the next.

The rear face of the 2.5 block is exactly the same as that on the optional 2.8-liter V6 AMC buys from GM. So if ever you're inclined, a swap is simple.

However, the Four should be adequate for most people. AMC doesn't announce horsepower figures, but torque is 132 ft.-lb., same as the GM

Iron Duke the engine replaces. More important, the torque curve is almost flat, so acceleration should be adequate with the 3,000-lb. vehicle.

### Jeep front end

Four-wheel drives used off-road are prone to wheel hop on sand and gravel. The smaller 1984 Jeep Cherokee and Wagoneer have a new suspension called Quadra-Link to correct this problem.

There are two rear-facing links (from axle to chassis) on each side, and each pair has a theoretical intersecting point at the rear of the vehicle, to provide counteracting leverage against the hop.

The front suspension also has a fifth link, hinged to the front of the axle on the right side and bolted to the chassis on the left. It restrains the axle and wheels to minimize any tendency of the axle to roll from side to side. **PM**

## How Havoline Supreme's 9 additives help you get the most out of your car.



### Proven protection up front.

Havoline Supreme with Texaco-developed additives, including a built-in friction fighter, protects engines against wear, rust, and bearing corrosion—and helps prevent acid, sludge, and varnish deposits.

What's more, Havoline's multigrade rating offers wide-temperature range convenience for year-round protection.

### Havoline's protection is proven.

The final test of a motor oil comes under actual driving

conditions. Havoline Supreme has proven it delivers the kind of protection needed in tough, high-speed state trooper cars and severe stop-and-go driving in New York City taxis.

### Havoline helps save gasoline.

Fuel economy tests proved it. Compared to a conventional motor oil, Havoline Supreme, with its special friction-fighting additive, helps save gasoline.



### Backed by improved mileage.

### Havoline is diesel tested.

If you own a diesel, we have good news. Havoline 10W-30 has the API-SF/CC rating required by most engines like yours. And it's been

proven in punishing diesel-powered taxis.

Engine protection and improved mileage. They come together. Thanks to Havoline Supreme.





# MUST LIQUIDATE AT BELOW DEALER COST! 4000 Watt, Gas Operated, Emergency Power Generator

**FACTORY NEW! FACTORY PERFECT!**

**DON'T let a storm rob YOUR home of vital electric power! With this 4000 watt generator, you ALWAYS have a reliable standby source of 115V and 230V plug-in power!**

- 8 hp. Briggs & Stratton 4-cycle gasoline engine!
- U.S. made! U.S. quality!
- 1 year warranty!

Over 350 service centers in the U.S.



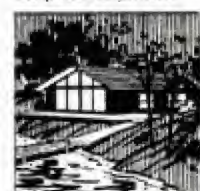
**FOR HOME!** Keep sump pump, well pump, appliances operating in case of any power outage.



**FOR WINTER STORMS!** No freezers or burst water pipes when you have this generator on hand.



**IN THE FIELD!** A reliable source of portable electric power anywhere.



**FOR CABIN or CAMP!** In the wilderness, you can enjoy comforts of electricity with this generator.



**Serious storms can occur anytime of year. Be prepared ALWAYS!**

A storm could knock out your electrical power for hours, or for days! Food could spoil in your refrigerator. A motor in your furnace could stop running in winter and leave your family shivering in the cold. A well could stop pumping water needed for cooking or bathroom facilities. The losses could cost you up to hundreds of dollars... or maybe even much more! And think of all the discomfort and inconvenience!

But, you never have to worry when you have this excellent quality portable generator. It's U.S. made! And it provides you with 3 convenient plug-in outlets for 115V and 230V service... 15 amps at each outlet. Just put oil in the crankcase, pour gas in the tank, and start the engine.

Use the generator to run your lights, a sump pump, well pump or power tools, etc. Plug in small kitchen appliances, a refrigerator, freezer, etc. Of course, you can't run everything at one time. (Remember the 4000 watt limit.) But you CAN run enough things to keep vital functions operating as you need them.

- 4-cycle, single cylinder, Briggs & Stratton engine.
- Produces 8 hp. at 3600 rpm.
- Recoil start. Manual choke.
- 4-qt. gas tank. Uses about .83 gal. per hr. at full load. (Runs longer with less load.)
- Chrome plated piston and aluminum alloy cylinder help dissipate heat for cooler running.
- Size: 17½" W x 25" L x 18" H.
- Shipping weight: approx. 140 lbs.

## PUBLIC NOTICE!

### Bankruptcy and Financially Distressed Merchandise!

We are authorized liquidators of inventories that must be quickly sold at sacrifice prices due to a variety of reasons, such as:

Overproduction. Last year's models. Order cancellations. Bankruptcy. Out of season. Plant closings. Economic recession. Financial difficulties. Excessive competition.

If you know of a company with surplus inventories that must be liquidated for immediate cash, call us Toll-Free: 1-800-328-0609. Only products in perfect operating condition will be considered.

Single phase.  
60-cycle

15 amp service. Two 115V outlets; one 230V outlet.

To determine max. load you can put on the generator, use this formula:  
Volts x Amps = Watts. (Don't exceed the 4000 watt max. limit.)

Compare at over  
**\$1,000.00**

**OUT THEY GO AT ONLY:**

**\$488**

**Pushbutton electric start model available at \$588**

Price subject to change after 60 days. Offer void outside original 48 states.

C.O.M.B. Co. / Liquidators Dept. F-101-1198  
6850 Wayzata Boulevard / Minneapolis, Minn. 55426

Ship me the 4000 watt Generator(s). (Indicate how many.):

☐ No. 1198 Manual Start at \$488 each.

☐ No. 1198 Pushbutton Electric Start at \$588 each.

I will pay shipping charge to driver upon delivery. (Allow 4-5 weeks for delivery. Add 2-3 weeks extra if paid by check. Sorry, no C.O.D. orders. Minn. residents add 8% state sales tax.)

☐ My check or money order is enclosed.

Charge my: ☐ MasterCard® ☐ VISA ☐ Am. Ex. ☐ Diners Club

Acct. No. \_\_\_\_\_ Exp. \_\_\_\_\_

PLEASE PRINT CLEARLY

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ ZIP \_\_\_\_\_

Phone \_\_\_\_\_

Sign here \_\_\_\_\_

Rural Route Customer: If truck carriers do not normally deliver to your home, include note with this order stating town address of nearest store, friend or truck terminal to ship to.

## CHRYSLER GOES TURBO

(Continued from page 116)

torque, the more noticeable it is. The driver can compensate easily in straight-ahead driving, but in turns the cars oversteer toward the longer shaft (in Chrysler's case, to the right) and understeer toward the shorter one.

Chrysler disposed of the problem completely (as did some Japanese cars) by making both axle shafts the same length and installing a stub shaft (bolted to the engine) between the trans-axle and the shaft on the right (long) side. The stub has a U-joint to compensate for any variation in mounting.

Chrysler also took further steps in its ongoing effort to reduce transverse power train vibration. It installed circular dampers on each axle shaft, to tune out a frequency that was creating a gear rattle. On turbos it installed a shock absorber-type damper between engine and chassis to stop engine hop on heavy acceleration.

There's also more poop for the rear drives. That symbol of unexciting durability—the slant-Six—is gone from the passenger car line. All '84s will have two or four-barrel 318 V8s as standard equipment.

## Electronics

Chrysler's electronics crew has a new dashboard for the Laser XE, featuring the same kind of bold color graphics as the '84 Corvette, plus 24 written and synthetic voice messages. Instead of the pompous "A door is ajar" that annoyed so many on the 11-message unit introduced in '83, this one says, "Please close the (location given) door."

The new dash, which is computer-controlled, has an ingenious method of automatically checking all exterior lights, even during daylight when they're turned off.

Wiring from the light switch runs through a tiny transformer to a set of bulbs. A second wire runs from the dash computer through the transformer. The computer feeds current to the transformer and this current is induced in the switch wiring. If the induced current finds an incomplete circuit, perhaps because of a dead bulb or wiring problem, the computer reads this and alerts the driver.

The 24-message dash also has built-in self-diagnosis that should appeal to those who like video games. Just press the TRIP and RESET buttons with the ignition off and the dash will go ablaze with color as all vacuum fluorescent segments light up. Press the U.S./Metric button and the computer will start a sequence of pulsing individual segments one at a time to make sure all segments are working.

PM



Credit card members can order by phone, 24 hours a day, 7 days a week.

**Toll-Free: 1-800-328-0609**

If busy signal, or if no answer, call:

**Toll-Free: 1-800-328-5727**

Outside Minnesota, call: **1-800-742-5685**

**C.O.M.B. Co.**

ONE OF THE NATION'S LARGEST AUTHORIZED MAIL ORDER LIQUIDATORS OF CONSUMER PRODUCTS  
6850 WAYZATA BLVD. MINNEAPOLIS, MN 55426



## FORD REFINES TURBOS

(Continued from page 118)

large passage and absorbs heat from around the hot turbine bearing, then flows down and travels back to the engine.

Borg-Warner, co-designer with a Japanese company, offered precise numbers: The design cuts peak oil temperature during an engine-off hot soak period from 590°, at which oil will coke, to 482°, at which it shouldn't.

The 1.6 turbo produces 115 hp, enough to cause noticeable torque steer with fwd. Ford installed shorter coil springs to lower the front end of the cars 0.6 inch. This cuts the difference in angles between long and short axle shafts, reducing torque steer. This step is similar to one Chrysler took on its turbo. Ford also stiffened the front suspension, the approach GM took on its fwd turbos.

Ford hedges its performance bet with two '84 diesels, a two-liter Japanese Four for fwd cars and a BMW 2.4-liter in-line Six (coming in the spring) for Continental and Mark VII. A turbo is standard on the BMW.

### Air suspension

The '84 Continental and Mark will have air-spring suspension. That promises a level car under all loads, less vibration and a more precisely tailored ride because the spring rate can be far more variable than with a conventional metal spring.

The computer turns on an air compressor to inflate, or opens a solenoid valve to deflate, the air spring—a neoprene rubber bag. It does this only when there is a load change, such as an additional passenger. Other changes in spring rate, as when the car is moving, are made by the air spring compressing on a specially shaped piston called a rolling lobe. If the lobe tapers inward, the bag can compress more easily over it (lower spring rate). If it tapers outward, it's harder (higher spring rate). On base models, the lobe has an hour-glass shape for a soft ride under most conditions, then progressively stiffer. On the handling version, the lobe tapers outward only, for a gradually stiffer ride.

The computer has a car-parked strategy that lowers the car after a delay of up to one hour, so before you jack up the car to do something like change a flat, you must flip a switch in the trunk to turn off the system.

Will the '84 Continental and Mark with high-tech air suspension have enough to turn on prospective buyers in the luxury-car class? Well, Ford also is offering a European winter accessory—heated front seats—that they hope will clinch the deal.

PM

# The Classic Collection



The Duchess

Classic Roadsters, Ltd., offers the ultimate for the do-it-yourselfer . . . beautiful classic automobiles which are superbly engineered for easy assembly and years of enjoyment.

Quality is the trademark of the Classic Collection. Carefully handcrafted reproductions of the 1952 MG TD (Duchess), the 1962 Austin Healey (Saxon), and the 1939 Jaguar SS-100 (Duke) are available unassembled or factory complete.



The Saxon

You'll never know how much you can love a car until you build one yourself! Call 1-800-437-4342 or mail the coupon today for complete details.



The Duke



## Classic Roadsters, Ltd.

1617 Main, Fargo, ND 58103 1-701-293-8866

Please send information packet on:

- ☐ Factory Complete ☐ Unassembled  
☐ Duke ☐ Duchess ☐ Saxon  
☐ Enclosed is \$1 for each model selected (color flyer and basic pricing)  
☐ Enclosed is \$10 for 28-pg. color products catalog, comprehensive pricing information and complete corporate report.  
☐ Enclosed is \$15 for assembly manual for:  
☐ Send business opportunity information.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Phone (Bus.) \_\_\_\_\_

Phone (Res.) \_\_\_\_\_

Charge my: ☐ VISA ☐ MasterCard ☐ Am. Ex.

Card Number \_\_\_\_\_

Expiration Date \_\_\_\_\_

PM1083



# ARE YOU READY FOR A CROSMAN?



Anyone who owns a Crosman will tell you—it's not kid stuff. Take our 760 Pumpmaster™ and 66 Powermaster™ for example.

Each shoots .177 pellets and BBs up to a whopping 670 feet per second. With super accuracy, too.

And both have pump actions to match your power needs. Pump a few times for safe basement shooting fun; pump up to 10 times for greater power outdoors.

Crosman gives you and your family other features like adjustable sights, steel barrels, and a clean, crisp trigger pull.

When you're ready to get serious about airgun fun, come up to a Crosman. At airgun dealers everywhere.

#1 IN AMERICAN AIR POWER

**Crosman**  
**Airguns**

Crosman Airguns, 980 Turk Hill Road, Fairport, New York 14450

## GM DROPS DISTRIBUTOR

(Continued from page 120)

intercooler of the SVO, but its turbo has a lightweight, resized turbine that responds faster to cut acceleration lag.

A second GM turbo debuts in '84 on the 1.8-liter overhead cam Four that Pontiac imports for the 2000 J-car. Along with port fuel injection, the turbo turns the 82-horse stock engine into a 150-hp screamer.

The engine has no exhaust gas recirculation valve (the camshaft was designed so valve operation traps enough exhaust gas for emissions control). Without EGR, information from a barometric sensor enables the computer to do a pretty good job of regulating a boost control solenoid, so the more sophisticated airflow sensor isn't used.

### Limited boost

Boost is limited to 9.4 p.s.i., and is lowered to 3 p.s.i. with the engine cold or near overheating. Boost also is controlled according to throttle position, so the driver gets a smooth increase in performance as he steps harder on the gas pedal.

If the engine knock sensor is triggered, boost and spark timing can both be set back, as on the V6.

Both '84 GM turbos are Garrett AiRe-

search units and have been modified to dissipate heat better. Also, they're in the airstream from the radiator fan, which keeps them cooler. As a result, both reportedly stay under 500° F. in an engine-off hot soak condition so that the oil doesn't coke.

Because the 1.8 turbo is in a front-wheel-drive car, it gets a stiff front suspension, GM's approach to reducing torque steer.

GM cars across the board should have somewhat better performance in '84, thanks to a change made to meet high-altitude emission specs. Except on Pontiac four-bangers, GM will change from the pellet-type catalyst to a monolith (single structure), which makes the exhaust less restrictive.

Although the primary '84 GM emphasis is on engine performance, the Olds diesel isn't a dead issue. In fact, Olds has a 100-horse version of the 85-hp, 4.3-liter, V6 diesel under development. A Cutlass Ciera with the 4.3 runs 0-to-60 in just 10 seconds. There's a good chance Olds will soon make a diesel equivalent of the Wankel-engine Mazda RX-7; that is, a high-output sporty car that people will buy without much caring what's under the hood.

Olds also is continuing general development work on the diesel, in case the fuel situation changes. The '84 glow-plug system is almost immune to burnout. New glow plugs contain two coils in series, the first to provide heat, the second a special design that limits current to the first, to prevent burnout.

### Electronic cruise control

All GM divisions have a new electronic cruise control with vacuum solenoid valves operated by a computer. This system needs less vacuum than the previous electromechanical one with its variable vacuum bleed, so there's less chance of running out of vacuum on long hills. It should reduce the many complaints from GM customers.

Chevy's '84 Camaro Berlinetta will feature an answer to the problem of the driver with short arms reaching instrument panel controls. The controls are on a pair of pods that slide fore and aft over an inch. Buttons are the touch type, so the pod itself won't move when you operate them. The radio is on a pivot mount on the console, so it can be canted toward the driver or passenger for easier operation.

PM



# TOUGH FORD RANGER. UNBEATEN QUALITY!



## AMERICA'S TRUCK BUILT FORD TOUGH

### TOUGH TRUCK QUALITY

At Ford, Quality is Job 1 ... that's why no import or domestic small truck tops Ranger's quality, based on a survey of owner reported problems during the first three months of ownership of 1983 trucks. And the commitment continues in 1984.



*Get it together—Buckle up!*

### MOST POWERFUL V-6 IN ANY SMALL PICKUP

Choice of four engines, including the most powerful 2.8L V-6 and 5-speed shift options. Plus comfort for three in the widest cab of any small truck.

Lights and push bar owner added. Ford assumes no responsibility for their use, availability, price, quality, safety or durability.

### Great MPG

39<sup>EST</sup> HWY 27<sup>EPA</sup> EST MPG

Std. 4x2 2.0L engine and 4-speed shift. Use for comparison. Mileage may differ depending on speed, distance and weather. Actual highway mileage less.

### BEST-BUILT AMERICAN TRUCKS





KITAMI, JAPAN, WHERE WINTER WINDS  
SWEEPING DOWN FROM SIBERIA REGULARLY  
DROP TEMPERATURES TO 80° BELOW ZERO.

**CORONA™ MADE FOR THE WORLD'S WORST WINTERS.**

**GLO**  
INTERNATIONAL

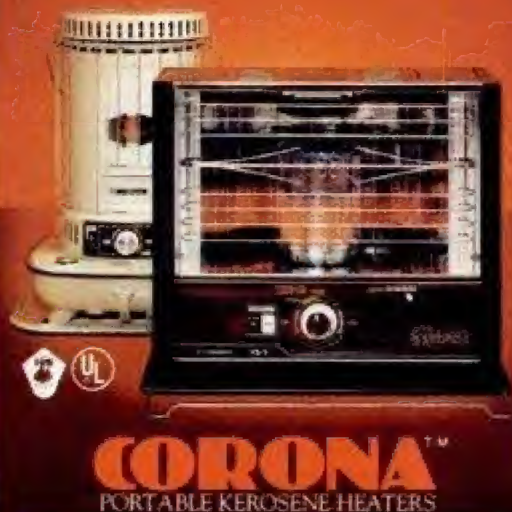
© 1983 GLO International Corporation/A Subsidiary of Rydal Manufacturing Company, 3975 Dayton Park Drive, Dayton, Ohio 45414. Check state and local codes for permitted use. California, Wisconsin and Massachusetts may restrict use in dwellings or buildings of human habitation. Do not use in a multi-family dwelling unless permitted by law and a suitable kerosene storage area exists outside the residence. \*For complete details of Corona's Three Winter Limited Warranty, contact GLO International.

Wherever you find a winter like this, you'll probably find Corona™ Portable Kerosene Heaters.

Built as rugged as the weather.

They're safe, economical, easy-to-use, and backed by a Three Winter Limited Warranty.†

For over 40 years, people around the world have faced the worst winters on earth with one portable kerosene heater. Corona.



## AMC'S DOUBLE THRUST

(Continued from page 107)

3.2 in. longer overall than the Alliance's length of 160.6 in.

Nine out of 10 Alliance owners surveyed in PM's *Owners Report* (page 74, June '83) said they'd buy the car again, which probably means these folks are going to be real happy with Encore. Both cars share four- and five-speed transmissions in all their models.

Both the 1984 Encore and the Alliance share engines, Renault's 1.4-liter, 56-hp four-cylinder with a compression ratio of 8.8:1 and bore and stroke of 2.99 in. by 3.03 in. The 49-state engine delivers fuel through a Bendix single-point injection system. The Left Coast gets a Bosch LU multi-point unit.

Encore has a few new toys in the bells-and-whistles department, just to demonstrate that the electronic circus isn't passing by AMC/Renault. New in both Encore and Alliance is an electronically tuned digital radio/tape stereo unit. It's much more efficient and certainly better looking than the AMC radios we're used to.

Still in the electronic vein, Encore will have AMC/Renault's new "Systems Sentry," a device which automatically samples vehicle fluid levels when the engine is switched off, checking

them off individually in a dash-mounted display pod and flashing a red or green light to announce fluid status.

In a second bow to gimmickry, albeit a more sensible one, Encore has an infrared door locking/unlocking device built in. The beam is generated by an emitter in the key chain, and the receiver is pod-mounted above the windshield on the headliner.

We previewed the new AMC/Renault cars in upstate New York at a time when rain was frequent, and we can attest to the real effectiveness of the infrared unlocking device in a downpour. The beam generator enjoys only spotty success, however, at ranges greater than about 25 feet or at oblique angles. It would probably be more efficient if the receiving unit were repositioned at or near the top of the dash.

It was a little sad that AMC's own vehicles got very small play during the company's new-car preview, though Eagle 4wd cars continue to soldier bravely onward. This year, the Eagle shucks its Pontiac-built Four in favor of AMC's own 2.5-liter, ohv four-cylinder engine. This is the same fine motivator going into the very competent new downsized Jeep XJs, and has the power band and driving feel of some six-cylinder motors.

Much of this year's AMC news is obituary. Neither the Renault Le Car nor the Renault 18i are going to be available here henceforth, though the 18i SportWagon (whose name is shared with the Jeep XJ utility vehicles) will remain on sale in the United States. Also biting the dust have been previously announced and new candidates: Concord, Spirit and SX-4 are all dropped from AMC's dance card.

California NOx standards tightened up right around Le Car's little intake manifold, choking off that model when it was felt the investment to make it comply with the West Coast requirement wouldn't be justified by future sales. The 18i was killed off by being too close to the market segment coveted by Alliance and Alliance-like cars, but at too steep a price in comparison. And the American Motors SX-4, its scrappy four-wheel drive churning gravel to the last, was shunted to oblivion when AMC decided its production complexities were too great to continue manufacture of a car which amounted to barely 10 percent of the entire Eagle line of four-wheel-drive cars.

Most noteworthy of all the AMC products we previewed were the remarkable downsized Jeep XJ-series utility vehicles. Here are transporters worthy of the Jeep imprint. They are



indicators of the future, and valiant enough to put the pride back into the AMC half of the Franco-American partnership.

## Stylish Jeeps

Weighing nearly 1,000 pounds less than the Jeep Cherokee and Wagoneer SportWagons which they replace, these stylish little dual-purpose vehicles are at home on the highway or on the trail. We had a chance to put the new XJs through their paces recently for two days and walked away very impressed. The on-road portion of our testing varied from smooth interstate highways to crooked mountain roads. Off-road, we encountered everything from even fire roads to terrain so severe it could only be negotiated at a crawl. Through it all, the little XJs performed flawlessly.

Ride comfort on the highway is good, yet the suspension is versatile enough to handle rugged off-road obstacles without undue bottoming. Handling is excellent. On the pavement you can indulge in controlled drifts if you're experienced and so inclined. The same holds true with fire roads—you can slide around turns like a dirt tracker at the county fair.

With any dual-purpose vehicle you never get the best of both worlds. You can't have a machine that can win an off-road race and give a Mercedes-quality ride. But you can't drive that off-road racer to the office or haul the family inside, either.

As compromise vehicles—which the XJs and any dual-purpose vehicle are—the XJs work extremely well.

One of the things that really impressed us about the XJs is their cooling system. During the off-road portion of our testing, temperatures were in the 80s and high 90s. Often, the vehicles were running at crawling speeds.

Naturally, being the rugged outdoor types that we are, we had the windows rolled up and the air-conditioning on. The XJs never came close to overheating. Anytime we looked at a temperature gauge, the needle was around 200°—well below the boiling point.

The downsized XJs come in two versions—Cherokee and Wagoneer. Both have the same wheelbase (101.4 in.) and the same overall length (165.3 in.). The Cherokee is available in both two- and four-door models. It is aimed at the more adventurous driver who may be equally at home in on-road or off-road environments. The Wagoneer comes in a four-door body style, and is aimed at the buyer who wants the added security of four-wheel-drive in a luxury wagon.

Although the new XJs are 21 in. shorter in overall length, 6 in. narrower in width, and 4 in. lower than the former Cherokee and Wagoneer, they

still have 90 percent of the earlier models' interior space. And they offer more cargo room.

Both come with AMC's newly designed 2.5-liter, four-cylinder engine as standard equipment. A 2.8-liter Chevrolet V6 is optional. We tried both engines. There's more than enough power for tackling any off-road obstacle with the inline Four. Our personal preference is the V6, simply because it accelerates a little faster.

A variety of transmissions is available, including a three-, four-, or five-speed manual, and a three-speed automatic. A 13.5-gallon fuel tank is stan-

dard, but an optional 20-gallon tank is available.

The owner of an XJ has one of the most versatile vehicles available: a recreational off-road vehicle, a utility vehicle, and a car for taking the family on a picnic or going to work.

AMC's president and chief operating officer, José J. Dedeurwaerder, told us more than a year ago that AMC 4wd technology was one of the reasons Renault decided to invest in the beleaguered American car builder. And if the Jeep XJ "Utes" are any bellwether, Renault's corporate interest is most well-founded. **PM**

# Buy Tools DIRECT at Rock-Bottom Prices!

**Black & Decker**

**STANLEY**

**SKIL**

**WEN**

**Rockwell**

**CHAN NEL LOCK**

**DISSTON**

**Crescent**

**6,000**

**NAME BRAND ITEMS**

**FREE 10-Pc. DRILL BIT SET WITH FIRST ORDER!**

**Name brand**

**Tools & Hardware at Low Industrial Prices!**

**Black & Decker**

**2-speed jig saw**

**FREE GIFT FOR YOU**

**STANLEY**

**SKIL**

**Rockwell**

**3/8" drill**

**AT A PRICE BREAKTHROUGH**

**AS SEEN ON TV**

**LUKIN**

**S-K**

**DREMEL**

**Milwaukee**

**PROTO**

**WISS**

Buy direct from U.S. General's catalog and enjoy ROCK BOTTOM prices on hand tools, power tools, automotive tools, motors, handyman supplies—6,000 nationally advertised name brand items at OFF prices. Save on all the famous names you know and trust—Stanley, Wiss, Proto, Skil, Crescent, Lufkin, Rockwell, Black & Decker, plus many, many more.

Thousands of serious minded craftsmen, mechanics, homeowners and hobbyists each send us \$1.00 just to get this big 196-page catalog of fantastic buys on brand name tools, hardware, and accessories.

Our bargains are too great and our prices too low for us to give away this big catalog to people who aren't really interested. So we ask for \$1 simply to discourage curiosity seekers.

But the way we look at it, the Catalog is REALLY FREE! We'll send you a Special \$1 Discount Check. Spend the Check just like money on any order and get your \$1 back. OR if you're not 100% satisfied with the catalog, just return the back cover which has your name and address on it and we'll refund your dollar immediately—(you keep the catalog).

As an extra "thank you" for acting now, you'll also receive with your first order no matter how small—a 10-piece High Test Steel Drill Bit Set (worth about \$4.00) absolutely FREE.

U.S. General Supply Corp., 100 Commercial Street, Plainview, N.Y. 11803

©COPYRIGHT 1982 U.S. GENERAL SUPPLY CORP.

## Who buys from U.S. General?

Thousands of individuals and companies. Here's a partial list of firms from our last 6 to 9 months customer list:

General Electric • IBM • Procter & Gamble  
E.I. DuPont • Honeywell • Union Carbide • RCA  
General Motors • Westinghouse • Mobil Oil  
Goodyear • GTE Syntex • Burroughs • NBC  
Dow Chemical • General Foods • Corning  
Kodak • Bristol Meyers • Standard Oil

**Same low prices for you—no minimum order required!**

**U.S. GENERAL SUPPLY CORP. DEPT. K-80**  
**100 Commercial Street, Plainview, N.Y. 11803**

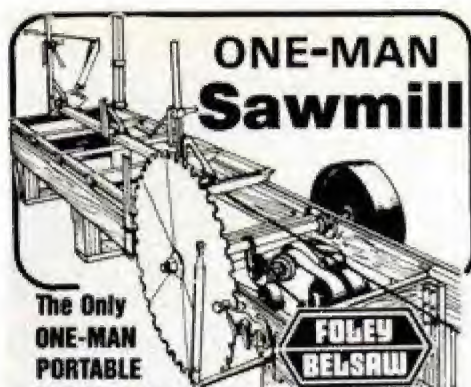
I enclose \$1. Please send your new 196-page fully illustrated Tool & Hardware Catalog with Rock Bottom prices. Also send a Special Discount Check worth \$1 off on any purchase. If I am not 100% satisfied with the Catalog, my \$1 will be immediately refunded.

(Print) Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_





## ONE-MAN Sawmill

The Only  
ONE-MAN  
PORTABLE

SAWMILL Of Its Kind In The World!

If you need good, high-quality lumber, don't let inflated lumber prices stop your important building projects. The Foley-Belsaw goes right to the trees and turns out smooth, true-cut lumber... even beginners get excellent results. Just one man (no crew needed) can easily cut enough on weekends to save hundreds of dollars over high lumberyard prices. For power use tractor PTO or other low HP diesel or electric unit. Factory-direct selling keeps price low, and convenient time payments may be arranged.

Send for **FREE BOOK!** Just mail coupon below for "How To Saw Lumber" booklet and complete facts on the One-Man Sawmill. There is **NO** Obligation and **NO** Salesman Will Call on you. **Do It TODAY!**

**FREE BOOK** **Foley-Belsaw Co.**  
30226 Field Building  
Kansas City, Mo. 64111

Please send all facts and details in your **FREE BOOK** "How To Saw Lumber". I understand there is **No Obligation** and that **No Salesman** will call on me.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City-State \_\_\_\_\_ Zip \_\_\_\_\_

## NEW—FREE COLOR CATALOG IN TIME FOR CHRISTMAS.



**Direct to the public.**  
Quality grand-  
father clocks,  
mantel clocks and  
others. In kit or  
finished models.

Viking clocks are crafted of the finest solid oak, solid walnut or cherry. No veneers, no plastics, no particle board and Viking is the only company that offers a Lifetime Service Guarantee on movements. Buy direct from our factory and save thousands of dollars off comparable clocks in dept. stores.

- Solid brass West German movements.
- Prompt delivery and money back guarantee.
- All kits are pre-cut and require only light sanding and finishing.



Create a family heirloom

**VIKING**  
CLOCK COMPANY

Phone 205/943-5081 • Box 490  
Dept. PM103, Foley, Alabama 36536

## SEAFARING FIRE ENGINE (Continued from page 93)

est truck in the department pumps 1,500 gpm.

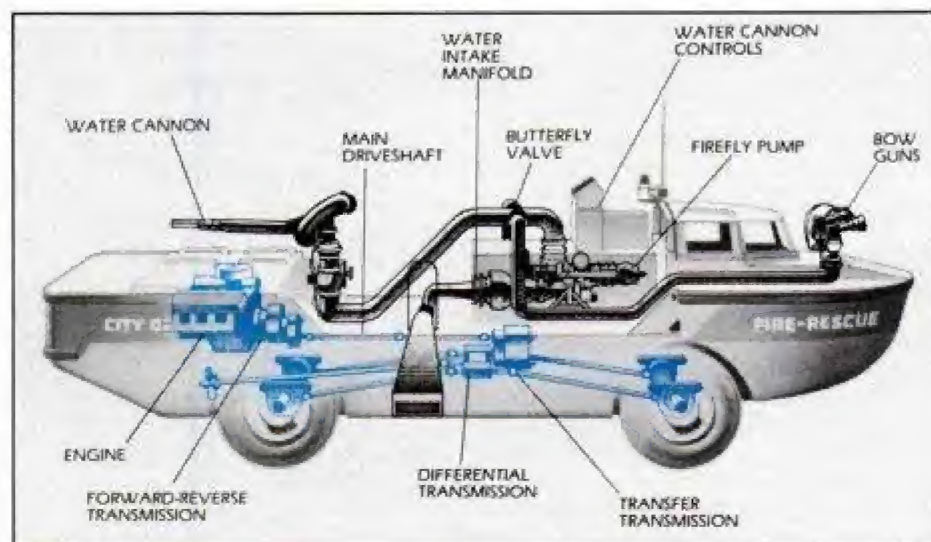
The amphibian was born when the city of Miami allocated \$400,000 for a new fireboat. Former Fire Chief Louis DeChime believed Miami could get the most splash for the cash by mounting a new, lightweight (2½-ton) Firefly pump on a LARC. To get about the same amount of pumping power in a conventional fireboat, the city would have had to spend about \$1 million.

The Firefly, manufactured by Kinetic Technology International of Santa Ana, Calif., is twice as efficient as a conventional pump. It uses the system NASA developed to send fuel to a Saturn V rocket from the vessel's fuel tank. The Firefly is powered by a jet-fuel-burning, 370-hp Detroit Diesel Allison-gas-turbine engine, a type commonly used on helicopters. However, the Firefly's design differs from a conventional pump in the design of its impellers, the

ing hits from explosions at a fire scene. The 350-pound pump may eventually be available in an all-titanium casing to maintain the protection while reducing its weight for efficiency.

Steering the Firefly is an adventure: The skipper must learn how to compensate for the powerful streams of water shooting from the hoses. The stern cannon could propel the amphibian, so the operator must power the boat to maintain position against the reactive thrust of the cannons. Recently, a firefighter overcompensated for the rear hose and rammed the stern up the bank of a freshwater lake near Miami International Airport, according to the former chief.

Miami is the logical place for the amphibious fireboat's "baptism by fire." The city has the largest passenger seaport in the nation in addition to 21 miles of shoreline on Biscayne Bay and other small waterways. The prob-



The amphibious fireboat used by the city of Miami has two forward and two reverse modes for smooth shifting. The Firefly pump's butterfly valve allows for several water cannons.

propeller-like devices which help pull water into the pump and spin at terrific force. In a conventional pump, the two impellers resemble ordinary propellers, but the Firefly's impellers are shaped like screws or washing-machine agitators.

The first, or inducer, impeller spins at about 3,000 rpm. But in the Firefly, the second, or main, impeller spins at 6,000 rpm. It fires 3,000 gpm at 150 p.s.i. into the hoses. In addition, the impellers are closer to the intake suction piping on the Firefly.

KTI is developing a new pump called the Firefly IV. The latest model will pump 10,000 gpm at 70 p.s.i. The new pump's casing, made of hard anodized aluminum and stainless steel, is designed to ensure longer life for the pump parts by improving heat flow and preventing the working parts from tak-

lems facing firefighters in Miami are going to put the fireboat through a wide range of very tough testing.

In service since last December, the amphibious fireboat hasn't yet had a chance to stretch its limits. It quenched a couple of brush fires on uninhabited islands in Biscayne Bay and was called into service as a fire was winding down in an abandoned bayside rooming house. For about a month last summer, its pump was in California being repaired.

Some day, firefighters hope to use the amphibian for fires on ships, in high-rise condominiums along the shore, at shipyards, on islands, even in hurricane-flooded areas. DeChime believes so strongly in its worth he has retired early and formed a company, with a partner, to market the firefighting amphibian.



# Get into the booming field of solar technology.

## Now NRI's Home Study Course in Air Conditioning, Refrigeration, and Heating Includes Training in Heat Pumps and Solar Energy Systems.

Prepare yourself for a whole new career in one of the fastest growing fields around. As energy needs continue to grow and energy sources become scarcer, the demand for skilled technicians will soar. NRI can get you started in this opportunity area, and you learn at home in your spare time, tailoring your training to your need with a choice of NRI's Basic or Master Courses.

### Includes Professional Vacuum Pump and Tools

NRI training is practical training. Along with "bite-size" lessons in theory and practice, you get practical bench training. NRI's Master Course includes professional tools...a system analyzer, leak detector, tubing and joint tools, and more. Plus demonstration units that graphically bring principles to life for easy understanding.



## Optional Post-Graduate Training at York Institute

Graduates of the Master Course are eligible for a concentrated week of resident training at the famous York Institute at no extra charge for tuition or training materials. Here, you'll work on advanced industrial equipment under the guidance of expert instructors. Only NRI includes this opportunity.

### Send for Free Catalog, No Salesman Will Call

Use the postage-paid card to send for NRI's free catalog showing all the equipment and describing the complete course.

standing. You even get a top-quality professional vacuum pump for troubleshooting experiments and use on the job.

Over a million students have trained at home the NRI way. You can, too. If card has been removed, write to the address below.

## Or check card for other growing fields

### Small Engine Repair

There's plenty of opportunity for the man who can service power mowers, garden tractors, chain saws, outboards, mopeds and other small engines. Training includes professional tools and an actual 5 HP engine you keep, plus optional residence training at the Tecumseh Factory Service School at no extra charge.

### Electrical Appliance Servicing

Good appliance people are hard to find. NRI trains you for your own full- or part-time business fixing everything from refrigerators to toasters. Includes professional tools and instruments.

### Auto Repair and Servicing

A good mechanic can work just about anywhere he wants. NRI trains you at home from headlight to taillight with pro tools

included. Approved by Richard Petty, NRI automotive consultant.

### Building Construction

Save up to 50% building your own home, get a better job, or even start your own contracting business. Covers everything from foundations to rafters with practical projects emphasizing energy-efficient construction.



**NRI Schools**  
McGraw-Hill Continuing  
Education Center  
4939 Wisconsin Avenue  
Washington, D.C. 20016

**We'll give you tomorrow.**



namics aids are also applied to the rocker panels, wheel openings and two-part, two-level rear air spoiler. It's said by Ford to manage airflow better, and once you overcome an initial strange feeling about its looks, the thing really begins to grow on you. The total effect of the SVO reworking of the Mustang is a successful one, in looks and equipment. Our drive in the SVO Mustang supports this assessment.

The interior of the SVO car is virtually standard-issue Mustang, except for the placement of a few switches on the floor console. One of these is a premium/regular switch that instructs the engine electronic control system to recalibrate for both types of unleaded fuel.

Gear changes are done with the great-feeling Hurst shifter, a movement of grace under pressure in this case for positive throws with easy, fluid motion. There are other smaller, mostly subtle touches which make the SVO car different from its GT brother. But there is so much stuff standard on the new Mustang that only six major options exist: air conditioning, tape player for the radio, power door locks and windows, flip-up sun roof and leather seat trim.

### Working up a sweat

The new turbocar runs off from a dead stop like a scalded dog, with turbo and engine working up a sweat to the redline in each gear almost as quickly as one can accelerate. There remains some of the 2.3-liter engine's buzziness under load, but unlike other Ford applications, this means much horsepower is being transferred to forward motion quickly.

Our preview of the car was on Ford's Dearborn test circuit, in traffic and under conditions that precluded our own 0-to-60 mph clockings. But Ford claims it can be done in less than 7.5 seconds. This would be consistent with the car's power and weight. We look forward to doing a full test report on the turbocar.

However, the SVO Mustang does exceptionally well on the fast course, something we did play with at length. The Mustang's prowess can be attributed to its unique suspension, utilizing Koni gas-pressurized, adjustable shocks. These are pretty interesting items. They can be set for "cross country" (front and rear), "GT" (front only) or "competition" (front and rear). Unique spring rates, special-sized stabilizer bars and traction bars assist in getting the ponies to the pavement. And best of all, the hardware works. The vehicle's race car-like handling characteristics allow very little roll in hard cornering, permitting the driver to

toss the SVO Mustang into turns with the confidence born of directional stability. It's definitely a nice piece of work.

### At Lincoln-Mercury

The Cougar XR-7 returns from obscurity to get back into the performance picture. For 1984, XR-7 comes back with its standard 2.3-liter turbocharged engine, and with both the three-speed automatic or five-speed manual transmissions standard. I also drove this car around the Dearborn loop. It's a striking black-on-black model that performed as well as its looks promised.

Cougars of every stripe get fuel-injected engines this year, meaning the 5.0-liter HO V8 can have a three-speed automatic transmission. The heavy-duty suspension netted wider wheels, too, up a half inch to 14×5.5 inches.

Mercury's Topaz adds a 2.0-liter diesel engine this year, courtesy of Ford's Japanese brothers at Toyo Kogyo. It's an engine which won't see service in California. Because of its efficiency and its displacement near the gasoline engine, the diesel has decent performance, almost up to that of the Topaz standard 2.3-liter HSC (High-Swirl Combustion) engine.

Topaz's unitized body sits astride four-wheel independent suspension components, with rack-and-pinion steering and front power-disc brakes backed up with drums in the rear. Handling upgrades call for the TR-handling package, consisting of Michelin TRX rubber, stiffer suspension bits and cast aluminum wheels with locking lugs.

The Mercury LN7 has been discontinued for 1984, so Ford took its bubble-back rear window and put it on the new EXP, then added aero body pieces, blackout paint and a tiny turbocharger to EXP's 1.6-liter, four-cylinder engine. The EXP Turbo, Ford expects, will achieve 1.2 hp per cubic inch with its standard five-speed gearbox. And a rear spoiler and front air dam were attached. Power is an estimated 110 hp at 5,000 rpm, with 120 ft.-lb. of torque at 4,000 rpm.

### EXP suspension

Suspension revisions include lowering the front ride height by ¾ inch to help eliminate torque-steer characteristics, increasing spring rates and using Koni shocks with special valving. All EXPs get revised interior treatments.

Even though the EXP Turbo suspension is revised, it's still unable to handle the turbo power at its fullest extent. New seats help keep the driver in position, but EXP is still subject to wander in turns where one is right up upon the turbo boost. Boost can go up to 8 p.s.i., and comes on quickly.

Efficiency has been on Ford minds

for some time. Ford Concept 90 and Continental Concept 100 experimental vehicles have resulted in the sleekest luxury car yet built on these shores—the Continental Mark VII.

Mark VII is 350 pounds lighter, 13 inches shorter and 1.5 inches lower than the Mark VI it replaces, yet it retains the interior dimensions associated with the big car. In addition to its slippery styling (which Ford says results in a 0.38 drag coefficient), the Mark gets a new air-spring suspension system, developed jointly by Ford and Goodyear. The Electronic Air Suspension (EAS) accommodates continuous, three-way leveling operations, using a microprocessor to oversee ride height.

Standard engine is Ford's injected 5.0-liter V8, coupled to a four-speed automatic overdrive transmission. Later in the season, Ford will offer the car with a 2.4-liter turbocharged diesel engine supplied by BMW.

An LSC version (for luxury sport coupe) will lean in the direction of better performance. It will have stiffer-rate suspension components, including special EAS air springs, a handling suspension, fog lamps and quicker-ratio power steering than the basic Mark or several designer editions. And though the sexy new face comes standard with the raft of equipment this class of car normally features, the really hard of core will want the digital compass/outside temperature/ice alert warning.

### Mustang GT and Capri RS

The Mustang GT/Capri RS duo won't be hurting in the performance area, either. Both get fuel-injected, 5.0-liter engines coupled to automatic OD transmissions, or new HO versions of the pavement-wrinkling 5.0-liter that pump out 205 hp at 4,600 rpm, with 245 ft.-lb. of torque at a low 3,000 rpm. The macho motor is only available with four-barrel carbureted fuel delivery and five-speed manual overdrive gearbox.

A running change to the engine will result in magical things: tubular headers, dual exhausts, higher-lift camshaft, forged pistons and full-throttle alternator cutout. In the same brush strokes, the Handling Suspension will be transformed into the Quadrashock Suspension. This will incorporate front and rear gas-pressurized shock absorbers and a neat arrangement at the rear wheels. The vertical shocks will be supplemented by horizontal, double-acting hydraulic shocks, acting as axle rotation dampers to cure the classic Mustang GT/Capri RS axle wind-up troubles. This will allow much more efficient use of all that horsepower.

Another running alteration will relocate the brake and accelerator pedals to facilitate heel-and-toe gear changing—for lots of get up and go. **FM**



**NEWEST RELEASE!**

Warning: The Surgeon General Has Determined  
That Cigarette Smoking Is Dangerous to Your Health.

# U.S. Gov't Report:

**Carlton Box—Lowest Tar King. No Brand Listed Lower**

Less than 0.5 mg. tar, 0.05 mg. nicotine

**Carlton—Lowest Tar Menthol**

Less than 0.5 mg. tar, 0.1 mg. nicotine

**Carlton—Lowest Tar 120's**

Regular & Menthol—6 mg. tar, 0.6 mg. nicotine

**Carlton 100's Regular & Menthol**

Less tar than over 160 brands—4 mg. tar, 0.4 mg. nicotine

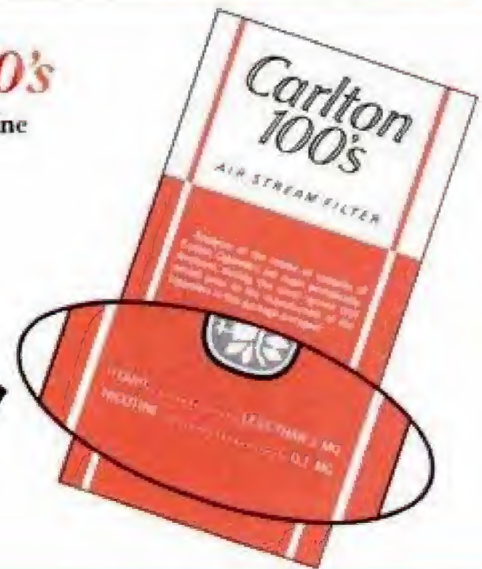


**19th Consecutive Report: No Brand Listed Lower Than Carlton.**

**Carlton Box 100's**

Less than 1 mg. tar, 0.1 mg. nicotine

*Read the numbers  
on the packs* →



Box King—lowest of all brands—less than 0.01 mg. tar, 0.002 mg. nic.

# Carlton is lowest.



Box: Less than 0.5 mg. "tar", 0.05 mg. nicotine; Menthol: Less than 0.5 mg. "tar", 0.1 mg. nicotine;  
Soft Pack and 100's Box: 1 mg. "tar", 0.1 mg. nicotine; 100's Soft Pack and 100's Menthol: 4 mg. "tar", 0.4 mg. nicotine;  
120's: 6 mg. "tar", 0.6 mg. nicotine av. per cigarette, FTC Report Mar. '83.



# BRING YOUR WOOD BURNER INTO THE TWENTIETH CENTURY

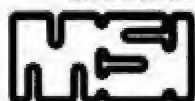
YOU'VE BEEN SAVING ENERGY WITH YOUR WOOD BURNING STOVE. NOW SAVE EVEN MORE WITH THE NEW

**VERSAGRID®**

CATALYTIC CONVERTER KIT. INCREASE HEAT OUTPUT, BURN LESS WOOD, REDUCE CREOSOTE AND POLLUTION. COVERED BY A 5 YEAR WARRANTY AND INSTALLS IN JUST 15 MINUTES. ONLY \$139.95 DELIVERED



**ORDER TODAY  
SAVE FOR YEARS**



MARKETING  
SERVICES  
INTERNATIONAL

7037 WEAVER WAY,  
DORAVILLE, GA. 30340  
TO ORDER CALL:  
1-800-241-1667 EXT. 806  
FOR INFORMATION CALL  
404-448-0003

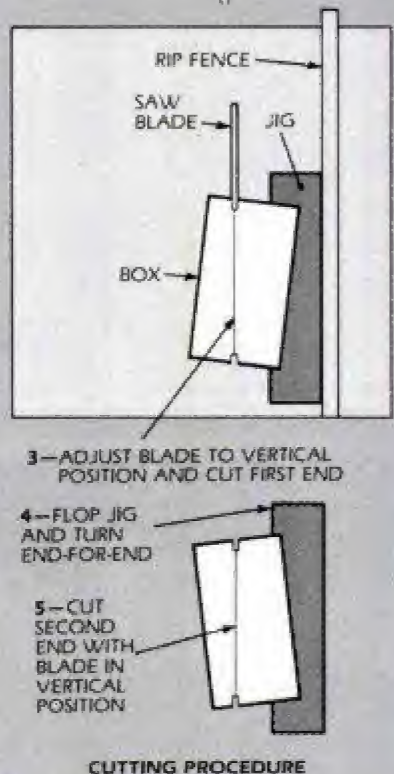
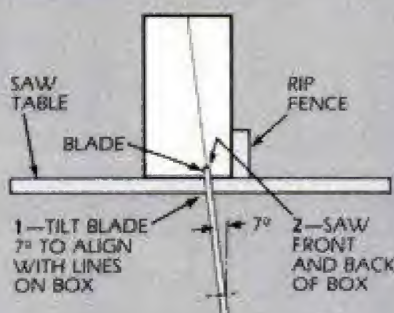
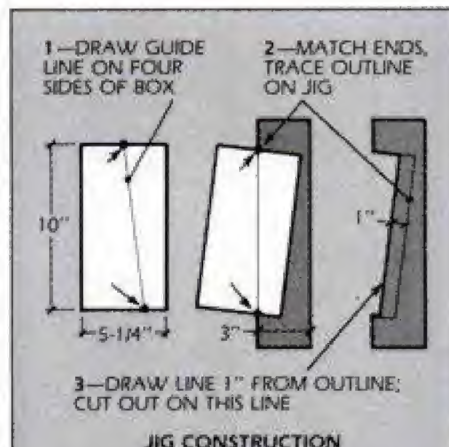
## A CLASSIC LAP DESK (Continued from page 101)

interfere with sawing the box into two parts. On the hinged side keep nails far enough from the sawed edges so they won't touch the hinge screws.

After the glue dries, sand with 150- and 220-grit abrasive in a portable or a stationary belt sander, or with an orbital sander. Using fine 220-grit sandpaper on a block, ease all corners. Then sand the top edges a little more. It's

important to shape the wood to the slightly rounded brass corners.

Mark lines on the front, back and ends for separating the box into two parts (see drawings at left). You'll need to remove the guard from the table saw for this job. Tilt the blade about 7° from vertical, lower the blade so only 3/4 in. extends above the table, and make the front and back cuts, using the rip fence.



To prevent the glued surfaces from sliding out of position, you should prebore holes before nailing. Take care not to use any nails near the diagonal cutline which divides the box into top and bottom.



Make the lengthwise cuts at a 7° angle [see the drawings at left]. Then return the blade to the vertical position and use a jig in order to make the two end cuts.

Make a simple jig to hold the box at the proper angle to the rip fence while making the diagonal end cuts. Move the blade back to the vertical position and use the jig against the rip fence to make these cuts. A fine-tooth plywood blade works well for this job.

Install the lock before gluing and nailing the tray in place. Lock No. H-2080 from Craftsman Wood Service Co. (1735 West Cortland Ct., Addison, Ill.



60101) can be used. Chisel away the wood and shape the keyhole, following instructions supplied by the maker. A high-speed hand grinder with a flat end burr is helpful in doing the final smoothing.

### Building the accessory tray

Rip  $\frac{3}{16}$ -in.-thick strips of mahogany on the table or radial-arm saw for the accessory tray. Sand both sides. Cut pieces to the dimensions shown and assemble, checking the fit inside the box.

Make a concave insert to hold pens and pencils. Apply glue to the ends and to the side that's adjacent to the box and nail in place with a wire brad at each end.

Attach the other three panel support strips  $\frac{5}{16}$  in. from the edge. Cut two  $\frac{1}{4}$ -in. mahogany panels to fit. Stain and apply satin finish polyurethane to the backs of both panels and to the entire assembly.

I duplicated the original's slightly brownish mahogany stain by mixing  $\frac{2}{3}$  Minwax red mahogany to  $\frac{1}{3}$  special walnut. After the stain dries, fill nail holes with matching color. Weldwood blend stick works well for this.

Since mahogany is open-grained wood, you'll get a smoother surface if you next apply paste wood filler which has been tinted with the same stain used for the first coat. Follow instructions on the can, rubbing across the grain.

Follow up by using two or three coats of satin finish polyurethane. Do not

apply stain or finish to the hinged edges because velvet will be glued to them later.

### Installing the hinges

Using a sharp wood chisel to mark the locations and to pare away the wood, set the  $\frac{3}{4} \times 1$ -in. brass hinges in  $\frac{5}{16}$  in. from the ends and flush with the surface. This allows for two thicknesses of velvet when the lap desk is closed. Bore the holes and then screw the hinges in place.

On the upper or unfinished side of the two panels, draw lines  $\frac{5}{16}$  in. in from the edge, parallel to the ends and out-sides of the opened box. With the panels in place, apply to the larger one a thin, smooth coating of glue, extending it just to the outside of the line you have drawn.

Lay the velvet in place, brushing out wrinkles. Coat the smaller panel with glue in the same way, draw the velvet fairly tightly across the center, lay it on the glued surface of the smaller panel and brush out any wrinkles that have been made.

After the glue has dried, remove the panels from the box and use a steel

*(Please turn to page 168)*



Fit the lock into the front of the box. I removed most of the wood with a chisel, then used a high-speed hand grinder in the finishing stages. You may prefer to do this job before you start assembling the desk.

# Tonight, instead of watching the stars...



FOR AUTHORIZED  
TV RECEPTION ONLY

## watch the stars!

No matter how far you are from the TV station you can see your favorite stars... on Apollo<sup>TM</sup> home satellite TV! Find out how you can see the stars for less than you expect. Call toll free 1-800-647-6144, Dept. 38 or write to:

Free Brochure, National Microtech, P. O. Drawer E, Grenada, MS 38901

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_

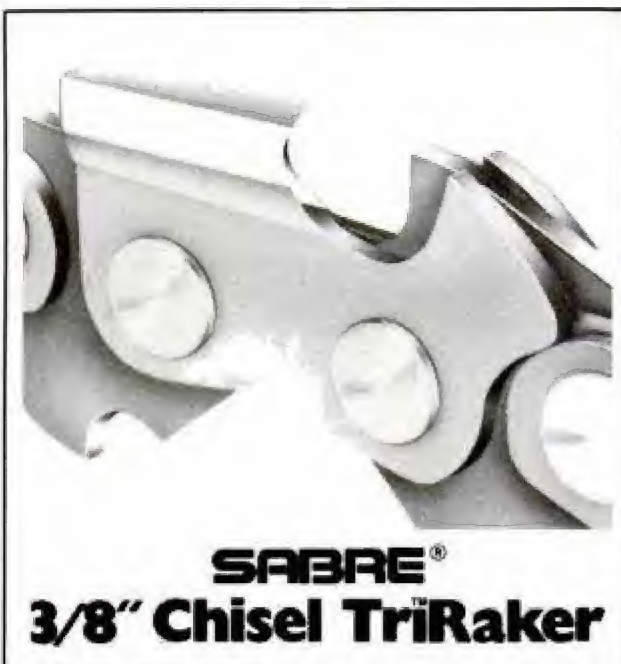
PM



**Apollo**

You can see the difference





## NEW DISCOVERY Reduces Chain Saw Kickback Up To 83%

Kickback has always been one of the greatest causes of chain saw accidents. . . but now that threat is greatly reduced\*, thanks to a new discovery by SABRE. It's the new SABRE TRIRAKER™ SAW CHAIN — a patented triple depth gauge 3/8" cutter that gives additional protection without giving up any cutting ability. Ready to go to work for you today. Get yours and see!

Available at all participating



There are more than 6,000 True Value Hardware Stores in 50 states. Look under "Hardware" in the Yellow Pages.



\*Kickback is reduced but not eliminated. You should continue to use any safety or protective devices. . . chain brakes, nose guards, etc. . . provided by the saw manufacturer.

### A CLASSIC LAP DESK YOU CAN BUILD (Continued from page 167)

straightedge and razor blade or utility knife to remove excess cloth.

Cut mahogany veneer to shape with sharp household shears and glue it to the 5/8-in. margin around three sides of each panel. If you use Elmer's glue or something similar, you'll have to clamp wood over each strip until it dries. Follow the maker's directions for contact cement. Stain and varnish the veneer trim and edges. Cut the slot and install leather tabs.

Trim the velvet to fit between the two hinges, apply glue to the box edges between the hinges and set the two panels in place. Press the velvet down on the glued edges and leave the box open until the glue is dry. Install the catch to hold the large panel when the box is opened. Glue a piece of felt or corduroy to the bottom of the lap desk so it cannot scratch any surface.

If you attach an escutcheon around the keyhole and stop right there, you will have a nice-looking lap desk. However, if you want a really beautiful one—a reasonably true reproduction of the Mark Twain lap desk—you'll need to add some brass trimming: a name or initial plate, decorative escutcheon, brass corners and brass corner straps.

#### Installing the brass trim

The corners and corner straps cannot be surface mounted, as this would interfere with opening the lap desk to its fullest extent. A raised nameplate could scratch a tabletop. All brass should be flush mounted.

Before you begin chiseling for the brass mountings, it's a good idea to practice on scrap wood. Use a sharp 1/8- and a 1/4-in. wood chisel. Keep a cloth under the box to protect the finish and



Using a mallet, 1/8- and 1/4-in. wood chisels, remove the wood to a 1/2-in. depth. Fit the brass frequently to check depth.

anchor the box with some blocking. As you work, keep both hands behind the sharp chisel edge.

Lay the brass corner (or other brass trim) in the proper location and outline it with an awl. Using the 1/8-in. wood chisel, bevel toward the part to be removed, cut straight down around the outline to establish the edge. Then remove enough wood within the boundary to permit the brass to fit evenly, flush with the wood surface.

On the corners, you'll find it necessary to make a new perimeter line just outside the original as you remove a layer of wood. After you fit each piece, remove it and apply a thin line of stain around the edge of the cut.

Secure all brass parts with contact cement. Apply it to the wood and to the back of the brass, wait for the period of time recommended by the maker and press the brass in place.

To make the 1/2 x 3-in. straps around each corner, you can use the same 26-ga. brass or you can purchase 3-in.-high brass stick-on sign letters. The latter save time and are difficult to differentiate from thicker brass. Cut portions of the letters to give you the dimensions you need and stick them in place.

With the last piece of brass trim in place, you are ready to use the handsome lap desk.

FM





# **MAKE YOUR STEREO SOUND SUPER FOR ONLY \$4.50**

## **THE SOUND RIVALS THE MOST EXPENSIVE SPEAKERS**

### **IT'S A GREAT DEAL BUT THERE'S A CATCH**

Only \$4.50? It's true. Sound that rivals the most expensive speakers? That's also true. But there is a catch to this deal. Not number 22. Actually, our first. Read on.

We're a new company. We need customers. So we're offering this special deal, on a very special product. The headphones are very new on the market. You'll see similar models just beginning to appear in hifi stores bearing respected names like Sony and Toshiba.

Actually they're miniature versions of the famous new technology headphones that wrap around your head with a steel band. The mylar diaphragms are exactly the same. So the tight crisp response is unbelievable, over the entire 20-20,000 Hz frequency range. And as you probably know mylar domes simply don't work with normal speaker magnets. So the miniatures have the same powerful rare earth Samarium magnets as the ones you've seen.

But here's where the similarities end. There is no steel band to fit around your head and press against your ears. They simply slip into your ears. That makes them more comfortable, but what's more important something really amazing happens to the sound. You're closer to the music, it almost seems to envelope you. The sound truly is all encompassing. If you ever try the older style headphones again, you'll think you're missing half the sound you've

come to expect. You get these remarkable little speakers with a standard phone plug adaptor plus an extra set of foam covers.

Now you're saying you never bought a Walkman. Glad you thought of that. Because we also have this neat little radio. Take seven normal filter cigarettes. Line 'em up in a row. That's the size of it. Really, it's that small. Plus it comes with its own headphone set, and it's powered for up to 24 hours straight by two normal AAA batteries. Get the FM stereo version for \$22.50 or the slightly larger AM/FM model for \$27.50. Both include headphones exactly like the ones we've described.

Now if you like that idea, you don't mind the catch. Painless and easy, here it is: Try the radio and we'll throw in the extra headphones, adaptor and foam covers for only \$4.50 more.

So why do we do it? We're losing our shirts on the earphone, but we need to build our sales, and find people who like neat deals on neat electronics. We're a brand new division of a very large electronics company. And we want to show those guys at headquarters what we can do. The best way is very special deals like this. So you benefit.

To try this deal with your credit card call the RCD toll free hotline or send your check plus \$2.00 postage and handling. Specify group 1900 on FM or AM/FM on the radio. If you aren't 100% satisfied return it in the original carton within 25 days for a courteous refund. No hassles, no problems.

Be prepared to get an explosion of sound, at home or anywhere you go.



**RCD**

806 Custer Avenue  
P.O. Box 1494  
Norfolk, Nebraska 68701

call TOLL FREE 800-228-8108



## COPY-CAT TAPE DECKS

(Continued from page 95)

and it has no mike inputs. But it's one of the most automated units in this sampling. Bias and equalization are set automatically, but not in the extremely compressed manner of the conventional "ALC" type of automatic level control found in portable recorders.

The Sansui deck has two program-search systems. The tape-2 transport has one that's much like the Sanyo and Realistic units. But the tape 1 transport has a system that permits you to skip ahead or back up to nine selections.

This multiselection search aspect can be used with a special Sansui "computer-editing" feature. A "Compu Edit" key and the dubbing key are pushed in, and the pause and record controls for tape 2 are set. Then the tape 1 search function is actuated. When the search is completed and the selected tape 1 portion begins to play, tape 2 starts recording automatically.

The Compu Edit feature can also be used with certain Sansui turntables to interrupt recording when the tone arm lifts off the record and resume it when the arm returns.

Dolby noise reduction can be used

while dubbing a tape to correct for a non-Dolbyized original.

## Onkyo TA-W88

In contrast to the Sansui machine, the only automatic features on Onkyo's twin-transport deck are dubbing-level set and the standard auto stop at the end of the tape. Bias and equalization are set manually, and there is no program-search feature.

But the Onkyo does have high-speed dubbing and continuous playback. It also has stereo mike inputs, and it permits mixing the microphones with the tape being dubbed. The mikes can't be mixed with a line input, however.

To copy a tape, you push buttons to select the dubbing function and normal or high speed. Then the pause controls are engaged. Tape 1 is set for "play" and tape 2 for "record," and the pause controls are released simultaneously.

Continuous playback is selected by a pushbutton. Then both "play" buttons are depressed together. This sets up tape 2 to start as soon as tape 1 ends.

## Aiwa AD-WX110

The most striking feature of the Aiwa AD-WX110 is that, during high-speed dubbing, the unit can be set to copy both sides of a cassette simultaneously. An entire C-90 cassette can be dubbed in 22½ minutes.

The Aiwa also has continuous play. Unlike most decks with this feature, tape 2 always precedes tape 1. Operation in this mode, too, is simple. After the "continuous play" button is depressed, you merely push the tape 2 "play" button. Once tape 2 is finished, tape 1 starts.

Both transports have "cue-and-review." Tape 1 also has "program search." It's actuated by pushing in the "play" button at the same time as the "rewind" or "fast-forward."

Bias and equalization are set automatically for normal, chrome or metal tape, and there is a special knob for fine tuning the recording bias to match the various brands of normal tapes.

## Cybernet DD701

The Cybernet deck, the most expensive in the sampling, is one of the more versatile units. It has high-speed dubbing and it also has a simplified extended-play feature.

There are left- and right-channel mike jacks and separate, slider-type controls for line-recording level, tape-copy level and mike-mixing balance. The line and tape-copy level controls have companion stereo balance controls. The mike-mixing control is teamed with a reverberation control.

As in the Realistic deck, the dubbing level is completely adjustable to cover

(Please turn to page 172)

## "Get road control you can trust with KYB's Gas-a-just."

Bobby Unser  
Famed test driver  
3-time Indy 500 Champ

That's because Gas-a-just delivers more of the damping force needed to help keep tires on the road than either 2-tube gas shocks or ordinary shocks.

How does Gas-a-just do it? With high pressure; with special valving and single-tube construction.

Gas-a-just's high pressure system (at 2 to 3 times that of 2-tube models) makes Gas-a-just better than low-pressure gas shocks. And its combination of high gas pressure and special valving make it better than ordinary shocks, which rely on valving alone for damping force.

And Gas-a-just's single-tube construction is engineered to completely eliminate harmful foaming and aeration. So Gas-a-just is better than both other types at delivering road control that lasts and lasts without fading.

## Gas-a-just®

Shock Absorbers

**KYB®** Corporation of America  
Pioneers in gas shock technology.  
901 Oak Creek Drive, Lombard, IL 60148



# The Amazing FUELTRON™ Gasoline Vaporizer

Gives your car more power,  
better acceleration, easier starts



Fueltron's vibrating crystal oscillates 1.3 million times a second to instantaneously vaporize gasoline into a high density, cold vapor. Read about its benefits below.

## WHAT FUELTRON DOES

Fueltron has only one purpose—to vaporize gasoline in the intake manifold of a car engine. Every one of its benefits results from its superb ability to do just that. Here's a fast way to visualize how Fueltron works: Imagine you're sitting in front of a roaring fire with a fistful of wood chips in one hand and a handful of sawdust in the other. Throw the sawdust into the fire, and it will flare up and burn while it's still in the air...almost instantaneously. Throw the wood chips into the fire, and first their edges will begin to glow. After a while the chips will ignite, and eventually burn away. Droplets of gasoline from your carburetor behave like the wood chips. Pulled into the combustion chamber, their outside surfaces will start to burn right away. Many will burn completely, but some will be swept, unburned, out of the cylinder with the exhaust stroke, or will trickle down the cylinder walls, washing away vital engine lubricants.



Model 7000 (2 or 4 Barrel) Fueltron Kit consists of Dual Channel Amplifier, two crystal transducers.

Vapor from Fueltron behaves exactly like the sawdust, igniting completely and burning with high energy before it can be exhausted. Fueltron is the most effective gasoline vaporizer we've ever seen. Its vibrating crystal rips apart the molecules in a drop of gasoline, turning it into an easy-to-ignite vapor in *millionths of a second!* The photo, above, shows gasoline being vaporized by a Fueltron crystal.

## WHAT FUELTRON ISN'T

Fueltron is not one of those miraculous, gas-saving horsepower boosters you're always reading about. It won't eliminate the need for tuneups (though you'll probably need fewer), it's not a substitute for properly firing spark plugs, and it won't breathe life into a neglected engine.

## YOU NEED FUELTRON...

...if you're sensitive to the way your car's engine operates...if you know it should be capable of faster throttle response, smoother idle and quieter running...if the waste of gasoline caused by hard starts, stalls and engine flooding concerns you...if you want to use lower octane fuel with reduced engine knock. Nothing else you can do will increase your car's performance more, or is as economical and easy to install as Fueltron.

## HOW YOUR ENGINE WASTES FUEL

Every fuel intake system on every carbureted or throttle-body injected engine performs the same tasks. The carburetor atomizes gasoline into droplets which are carried into the manifold by the rushing stream of air. The manifold's job is to vaporize as many droplets as possible on hot manifold surfaces, mix them uniformly with air and carry an equal charge to each of the cylinders. When everything is warmed up, the system works pretty well. But cold-engine starts waste fuel, because the cold manifold can't vaporize the droplets of gasoline before they're swept into the cylinders, so they don't all burn. Low speed operation can be a problem, because air isn't flowing rapidly enough through the manifold to mix the fuel droplets evenly, resulting in an uneven mixture and ragged running. Acceleration causes two problems: First, the stream of gasoline from the accelerator pump can't be vaporized quickly enough by the manifold, so it tends to "flood" the nearest cylinders. Second, as acceleration continues, partially atomized fuel from the carburetor goes through the manifold so fast it can't mix evenly with air, so cylinders nearest the carburetor get a too-rich mixture, while those farthest away are starved for gas, and can suffer from lean-mixture knock.

## HOW FUELTRON CUTS FUEL WASTE

Because Fueltron vaporizes gasoline instantaneously, it fools the engine into thinking it's hot even when it's cold, thus giving fast starts. Because vaporized gasoline mixes more quickly and uniformly with air you get many benefits: Your engine runs smoother because the fuel mixture is evenly distributed among the cylinders, giving quieter operation, better driveability and increased low end torque. (In certified tests Fueltron increased engine response by 34%, with no increase in

fuel consumption).<sup>(1)</sup> The uniform fuel/air mixture virtually eliminates lean-cylinder knock, hesitation, stalls and flooding. Fueltron makes gasoline burn more completely, providing a boost in energy while reducing waste and pollution. Speaking of pollution, this is a good time to mention that Fueltron meets the requirements for sale in California.<sup>(2)</sup>

## THE DETAILS

A complete Fueltron system consists of an amplifier which provides an ultrasonic signal, and either one or two vibrating crystals called "transducers". Two and four-barrel carburetors require two transducers (photo at left); single barrel carburetors require only one. In the unlikely event that Fueltron fails, failure will not affect normal engine performance. Installation is simple; if you know how to remove your carburetor, the rest is easy. Simply insert transducers into the manifold, where they're held securely by retaining spring supports. Mount amplifier anywhere under the hood and make the simple electrical connections. No modifications to carburetor or manifold required. Complete instructions and warranty come with kit.

(1) Certified by Coordinated Research Council Driveability Test; Conducted by the Ethyl Corporation Laboratory, Detroit, Michigan.

(2) State of California Air Resources Board Executive Order No. D-132.

**Fueltronics Corporation**  
9101 Greenwood Ave., Niles, IL 60648

**Order today at these special introductory prices and start getting faster acceleration, easier starting and better all-around engine performance!**

© 1983 Fueltronics Corp.

Please send me a Fueltron Kit:  
☐ Model 7000 (2 or 4 Barrel) \$89.95 + \$4.75 shipping/handling  
☐ Model 7100 (1 Barrel) \$69.95 + \$4.75 shipping/handling  
(Illinois residents add 6% S.T.)

Name \_\_\_\_\_

Street \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Payment is by: ☐ Check ☐ Money Order ☐ Visa ☐ MasterCard

Card No. \_\_\_\_\_ Exp. \_\_\_\_\_

Order Toll Free Dept. R-100

**1 800 323-6556 (In Illinois 1 800 942-6345)**

(Orders only; operator cannot answer technical questions)



## COPY-CAT TAPE DECKS

(Continued from page 170)

special needs. But for most dubbing situations, a detented center position is provided on the control.

The Cybernet deck's most unusual feature is an extra set of input and output jacks on the rear panel. These connect to a graphic equalizer so that frequency imbalances in a tape being dubbed can be corrected on the copy.

The Cybernet unit has a special, dual-purpose feature called "Quick Start and Recording Stop" (QSARS). When this is engaged while dubbing,

both transports stop if a blank stretch longer than six seconds is detected at the end of a program segment on tape 1. When QSARS is used with the deck set for extended playback, the same kind of six-second null on tape 1 will stop that transport and start playback on tape 2.

### Sharp RD-688AV

Unlike the decks discussed above, Sharp's RD-688AV Professional Stereo Double Cassette Tape Recorder (\$650) is a self-contained machine that can play through its own built-in audio system. It's sold as professional equipment

for use by industrial and school audio/visual departments.

This Sharp unit has a flip-up carrying bar to simplify hefting its almost 21-pound bulk. It superficially resembles the "boom box" variety of stereo portables.

Its dual tape compartments are side by side, and its two pause controls are separated only by a record-muting key, an arrangement that makes precise editing easier. Another editing aid is an extended automatic program locating device (APLD).

A series of pushbuttons selects up to 11 four-second nulls between programs to search out on tape 1. Special forward and reverse keys activate the search. Both transports have regular fast-forward and reverse keys, which incorporate cue-and-review operation.

Apparently on the theory that tape hiss isn't noticeable in audio/visual operations, there is no noise-reduction system. But there are a number of recording, playback and mixing options. Mike and line recording can be performed either with automatic level control or with manual level set. This applies to dubbing, too.

In addition to two built-in microphones and a pair of stereo mike jacks, there's a jack for a single mixing mike, which feeds both channels. There are also echo and mixer/fader controls for this mike, which can be mixed with either a line source or a cassette during "play" mode, dubbing or regular recording.

There's a two-way, extended-play system. One transport is set in "play" mode with pause control engaged. The other is actually played. When the tape being played is finished, the pause control on the standby unit releases automatically. While the second tape is playing, the first tape can be flipped over, or it can be replaced with a new tape.

The Sharp recorder has a totally separate section, with its own inputs and outputs, for recording and playing back a projector-synchronizing signal on one of the two "flip-side" tracks.

### Choosing the right deck

So, which deck is right for you?

If you only need to dub an occasional tape, a simple, single-speed deck can prove perfectly adequate. However, if you want to copy a lot of tapes, and do a number of them in a single session, you will be better off purchasing a tape deck that provides high-speed dubbing.

Should you be planning to do a fair amount of tape editing, you'll want to consider a machine with facilities that make the job easier. The level of editing sophistication you want will determine the kind of features you need. **PM**



**Be Your Own Boss  
and Make  
\$12.00 to \$18.00  
AN HOUR!**

Find out how by calling ...

**1 (800) 845-3000**

(In Utah Call 1 (800) 662-8666)



... now for your Free Lifetime Security Fact Kit!

Your FREE Lifetime Security Fact Kit tells you how to make \$12.00 to \$18.00 an hour in your own Foley Full-Service Saw and Tool Sharpening Business. Your FREE Fact Kit explains how you can:

- be your own BOSS!
- work full time or part time, right at home.
- do work you enjoy and take pride in.
- operate a CASH business where 90¢ of every dollar you take in is clear CASH profit.

And it is so easy to learn. Foley gives you all the facts and instruction. No experience or special training is necessary. Foley tells you everything you need to know to be successful.

And there's plenty of business available in your area. You will quickly develop the skills necessary to earn a steady income. You will be able to sharpen all types of saws, garden and shop tools for home, farm and industry.

### NO LAYOFFS OR STRIKES

You will be able to set your own hours and not have to worry about layoffs and strikes. And there are no franchise fees. Any age person can succeed, even persons with physical handicaps operate successful sharpening businesses.

You can be like Steve Taylor of Brookville, Ohio, who told us:

**"... the first year I grossed \$21,000.00"**

Or James B. Jones, of Albuquerque, NM who reported:

**"This past summer my sales and service amounted to almost \$6,000.00 a month."**

But you've got to get the FACTS before you can get started. So CALL NOW for your FREE Lifetime Security Fact Kit. It's yours to keep with NO OBLIGATION and NO SALESMAN WILL CALL ON YOU.

If you prefer, you can mail us the coupon below to receive your FREE Fact Kit, but you'll get it sooner if you call NOW. The number is 1 (800) 845-3000. Call any time of day or night. WE PAY FOR THE CALL. Utah residents please call 1 (800) 662-8666.



**FREE  
LIFETIME  
SECURITY  
FACT KIT**



The Foley Company  
20029 Field Bldg.  
Kansas City, MO 64111

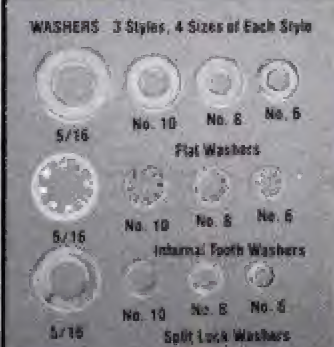
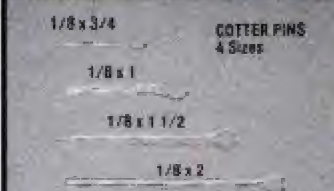
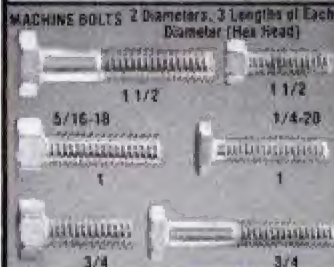
☐ YES, I want to know more! Please rush my FREE Lifetime Security Fact Kit. No obligation and no salesman will call.

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_  
STATE \_\_\_\_\_ ZIP \_\_\_\_\_



## LOOK AT ALL YOU GET!

2,101 nuts, bolts, screws, washers and cotter pins. Heavy-duty, polystyrene cabinet, 12" W x 5 1/2" D x 5" H. 25 preprinted labels. 55 individual compartments. 25 high-impact bins. 2" W x 5 1/2" D x 1 1/2" H.



# The Original NUT & BOLT SHOP®...

Just About Every Nut, Bolt, Screw, Washer And Cotter Pin You'll Ever Need—Over 2,100 Pieces—All Organized & Labeled In A Multi-Bin Cabinet!

Just  
**\$19.99**

plus \$3.90 shipping and handling  
LESS THAN 1/3 OF WHAT YOU'D  
PAY AT RETAIL HARDWARE  
STORE PRICES!!!

**PLUS THREE  
FREE GIFTS...**  
YOURS TO KEEP  
JUST FOR  
ORDERING!

### SPECIAL BONUS OFFER! 105-PIECE WALL ANCHOR SET

Complete set includes a total of 105 plastic, conical wall anchors. There are 3 different color coded sizes: you get 35 for 4-8 size self-tapping screws, 35 for 6-8 size self-tapping screws, 35 for 10-12 size self-tapping screws. All organized in a handy plastic case.



The complete  
105-piece set  
only  
**\$1.99**  
plus \$3.90 shipping  
and handling

**WORK SHOPS®**  
A PRODUCT OF D.R.I. INDUSTRIES, INC.

### OUR CUSTOMERS ARE AMAZED AT THE VALUE!

- "I don't see how you make a profit at such a low cost! I found it much more than I expected!"  
**M. D. Dorsette, Rockville, Maryland**
- "Quality is excellent. Great for do-it-yourselfers."  
**G. R. Daimage, Sunnyvale, California**
- "I've priced these items separately—it would have cost far more for them (at a hardware store)."  
**J. D. Russell, Cicero, Illinois**
- "Now your own hardware store for home, shop, or office!"
- "Heavy-duty, polystyrene cabinet, high-impact plastic bins and bin dividers."
- "2,101 fasteners total—all high-quality, zinc-plated (rust-resistant) steel."
- "No more piece-at-a-time trips to the hardware store."
- "Truly a \$75-plus value."
- "The most important 'tool' in your workshop."
- "As featured by the editors of MECHANIX ILLUSTRATED, POPULAR SCIENCE, WORKBENCH, FAMILY HANDYMAN, HOT ROD, MOTHER EARTH NEWS, AND OTHERS."

OVER 2  
MILLION COMPLETE  
SHOPS SOLD

Now you can have just the right nut, bolt, screw, washer or cotter pin at your fingertips... whatever the job! And for an almost unbelievable low price!!! With the NUT & BOLT SHOP—a complete size range of just about every kind of hardware you'll ever need. All organized in one 25-tray, 55 bin cabinet. Perfect for auto repair, home projects and hobbies. Office maintenance. And industrial shop use. Great as a gift, too!

No more time-consuming trips to the hardware store. No more less-than-professional looking repair jobs. No more searching through old coffee cans of odds and ends.

Order today, it's easy! Just complete and send the Order Form to D.R.I. Industries, Inc., 11100 Hampshire Avenue South, Bloomington, MN 55438, along with your check, money order or company purchase order. Or you can charge it to any one of 5 major credit cards: VISA, MasterCard, American Express, Diners Club, or Carte Blanche. (Credit card buyers can also call our 24-Hour Toll Free Number: 800-228-5000.) If you're not completely satisfied—if you're not truly amazed at all you get—just return it for a prompt, full refund, including shipping and handling charges. No questions asked! And you keep the FREE GIFTS for your trouble!

### CREDIT CARD BUYERS—JUST SAY CHARGE IT!

\*WORK SHOPS and NUT & BOLT SHOP are registered trademarks of D.R.I. Industries, Inc., Bloomington, MN 55438.  
© Copyright 1978 D.R.I. Industries, Inc.

### VALUABLE FREE GIFTS!

Yours to keep, just for ordering!

**FREE \$2.50 value 17 1/2" x 24" Specifications Chart.** Tells you everything you need to know about nuts, bolts, screws and other fasteners for a quick, professional job—everytime!

**FREE 3 Angle Level...** Ideal building and repair helper. Measures 45°, 90°, and 180°.

**FREE Surprise Gift...** It's sure to be something you can use.

All the Free Gifts are yours to keep...whether or not you decide to keep your order!



37591

### SPECIAL OFFER COUPON

MAG-86

SEND TO AND MAKE REMITTANCE PAYABLE TO:  
D.R.I. Industries, Inc., Dept. PM-1083, 11100 Hampshire Ave. S., Bloomington, MN 55438

How Many? ☐ Nut & Bolt Shop(s) at \$19.99 plus \$3.90 shipping and handling each. (00000110)

How Many? ☐ Wall Anchor Set(s) at \$1.99 plus \$3.90 shipping and handling each. (00000102)

(Limit One Set per Shop ordered. Bolt Anchor Sets cannot be purchased separately.)

I have enclosed my check or money order for the full amount. (MN residents add 6% sales tax.)

I have enclosed my company purchase order (this card MUST accompany ALL purchase orders)

Charge it to: ☐ VISA ☐ MasterCard ☐ American Express

☐ Diners Club ☐ Carte Blanche

Card No. \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_ (Need sign only if charging)

PLEASE PRINT NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_



# DO YOU HAVE WHAT IT TAKES TO MAKE \$22,500 A YEAR WITHOUT A COLLEGE DEGREE?

## Most of Our Grads Do It!

In fact, the first paychecks for students who graduated in the first four months of 1981 and went to work welding... ranged from a low of \$793 to a high of \$6,846. This is a yearly salary range from \$9,516 to \$82,152. Worldwide construction and pipeline firms compete for our graduates. Full course is only 16 weeks (others as little as 10 weeks). There are more jobs open throughout the U.S. — and the world — than there are qualified welders.

Tulsa Welding School, established for over 30 years, is recognized for the quality of its graduates throughout the world. Do well at TWS. — work hard — and your income as a welder can be higher than many college graduates.

## READY TO TAKE COMMAND OF YOUR FUTURE?

Call Toll Free 1-800-331-2934

In Oklahoma, call (918) 587-6789

Accredited Member of Nat'l Assoc. of Trade and Technical Schools — Approved for Veteran Training

**TULSA  
WELDING  
SCHOOL.**

## Fill in and mail today!

Admissions Director  
Tulsa Welding School  
3038 Southwest Blvd./P.O. Box 9829  
Tulsa, OK 74107

We'll send you a complete course catalog plus job list and pay at which recent grads have gone to work.

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_  
ZIP \_\_\_\_\_ PHONE (\_\_\_\_) \_\_\_\_\_  
Area Code

## COMPACT CARL HEALD HAULERS SQUEEZE THROUGH TIGHT SPOTS WITH EASE!

**NEW  
TOLL FREE  
NUMBER!  
1-800-253-1030.**  
(In Michigan call  
616/849-3400.)

3 or 4 WHEELS  
FOR WORK OR FUN!

11 or 16 H.P. available  
in all models.

SPEND LESS NOW  
ON EASY-TO-BUILD KIT.

SAVE LATER ON MAINTENANCE.



Hauler Mark 4  
Model HH-411  
shown with optional  
lights and knob tires

Up & down hills, across rough terrain and around sharp corners, hauler keeps a steady course. Forward, reverse and automatic torque converter. Totes over 800 lbs. Rear hydraulic disc brake gives a sure stop every time.

Other options available.

For more information, write or call today for  
FREE COLOR BROCHURE:

1-800-253-1030;

In Michigan call 616/849-3400.

**CARL HEALD, INC.** Dept. NSS  
P.O. Box 1148, Benton Harbor, MI 49022



Hauler Mark 4 Model HH-411 shown with optional cab, lights, emergency amber flasher, windshield washer and wiper. Optional bolt-on steel cab with vinyl canvas doors protect driver and rider from foul weather. Optional windshield wiper and washer for clear view.



Hauler Mark 3,  
Model HH-311  
shown with  
optional lights  
and knob tires

Choice of engine

available in all models. 11

H.P. Briggs & Stratton engine

is Synchro-Balanced for less

vibration. Speeds up to 20 mph.

16 H.P., opposed twin cylinder

Briggs & Stratton for more lugging

power, less vibration and greater low

and torque. Speeds up to 25 mph.

## WORK IN TIGHT PLACES

(Continued from page 99)

each accessory carefully for cracks and flaws. And remember never to use an accessory that is loose, damaged or out of balance.

With a little patience and practice, you'll be able to produce the carving projects shown here. **PM**

## MANUFACTURERS LIST— FLEXIBLE-SHAFT TOOLS

Black & Decker, Consumer Power Tool Div., 3012 Highwood Blvd., Raleigh, N.C. 27625 (Rotary Hobby Shop; two models available, \$59 and \$79).  
Dremel Mfg., 4915 21st St., Racine, Wis. 53408 (Moto-Flex Tool; constant speed Model No. 232, \$99; variable speed Model No. 332, \$110).  
Foredom Electric Co., Route 6, Bethel, Conn. 06801 (R-series motor with flexible shaft and SR-1 foot-operated, variable-speed control, \$185).  
Wen Products, 5810 Northwest Highway, Chicago, Ill. 60631 (Hobby Kit Center; two models available, \$100 and \$110).

## Other Uses For The Flexible-Shaft Tool



If you want to sculpture porous limestone, do so by using a large vanadium steel bur.



Refurbish old machine parts by using an abrasive disc and wire brush accessories.



Here is an example of ultrafine boring, using a common straight pin as the bit.



## DRESSED TO KILL

(Continued from page 92)

protectors and other protection may also be added before the final stage of dressing. The next step is a two-man job: pulling the jersey over the shoulder pads. Today's nylon jerseys are of fish-net fabric for better ventilation. Most have tearaway stitching. Down below, the player slips into his uniform trousers and again gets help when putting on his shoes.

### Personal foot flair

"The shoes are part of your personality," Joe Namath once said. The retired Jets super quarterback is the one who introduced pantyhose and "funky spats" into the game back in the '60s. The pantyhose kept Namath warm in the icy end-run of the long football season. Everyone laughed, but pantyhose are now standard equipment in a pro football locker room. The spats were special low-cut white shoes. After Namath introduced the personal foot flair, Baltimore Colts player Alvin Haymond followed suit, and within two seasons half the quarterbacks in the NFL were wearing special-order shoes to enhance their personal image.

Of course, football shoe design is a far more serious business. In the old days, players dragged their feet in hightops with metal spikes. The heavy leather shoe made feet sweat and never provided as much traction as a player needed. But in the past 10 years, football shoes have undergone a revolution, even as football fields underwent revolutionary changes.

Grass shoes are lightweight running shoes with seven rubberized cleats on each sole. They're made for the basic natural-turf field. Artificial-turf shoes have 75 to 100 cleats and special composite tongues and soles to reduce heat buildup in the shoes. Artificial turf can retain heat so well that an early autumn game in the South might be played in field-level temperatures near 100° F.

Canadian broomball shoes have about 15 suction cups on the soles and have become popular where natural grass has been planted in place of artificial turf. (The Orange Bowl in Miami switched in 1976.)

### Protecting the head

The football armor *piece de resistance* is the helmet, the second weightiest item in the player's wardrobe. The average pro football helmet weighs 3 pounds. The outer shell is a layer of shiny polycarbonate followed by a layer of aluminum lined with vinyl foam, styrene plastic and a thin sheath of leather. The inside of the helmet is lined with foam squares and plastic pods filled with an antifreeze or pure alcohol.

The pods absorb shocks and carry heat to the vinyl foam layer.

One of the most popular helmets on the market today—the Bike Air Power—uses an inflated inside liner to absorb shocks. After the player puts on his helmet, a bicycle pump tube is inserted in the helmet's ear hole and into an intake valve. The liner is then pumped up.

"Believe it or not, you really want the helmet to fit as tightly as possible without breaking your skull," Klecko says. "A loose helmet can do you a lot of harm by moving around when you get hit." The air-filled model gives the

tightest possible fit. The helmet itself is just the base of operations for a whole range of defensive devices for the player's head. A nose bumper of vinyl or other soft material sits at the center of the helmet above the bridge of the player's nose. A chinstrap keeps the helmet from moving sideways. Face guards and cages of various shapes and sizes complete the set of above-the-shoulder protection.

Paul Brown forced his Cleveland Brown players to be the first to wear face guards back in the 1950s. Players took to the devices grudgingly, com-

(Please turn to page 176)

## The right size wrench for EVERY job! TRAQ MASTER WRENCHES™

- fits over 20 bolt sizes
- works on metric and standard sizes
- guaranteed for life!

One Standard and  
One Heavy-Duty,  
Also Jumbo

~~\$20.99~~

NOW ONLY \$14.99

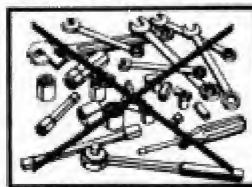
STOCK NO. TMW 1011



ADJUSTS TO FIT ANY BOLT



TIGHT GRIP IDEAL FOR DAMAGED BOLTS.



2 WRENCHES REPLACE ENTIRE TOOL BOX.

A breakthrough in tool design! These ingenious wrenches are self-adjusting to fit over 20 different sizes of bolts. Simply turn the handle for a tight, snug fit on every size nut and bolt from 9 to 32mm and 3/8" to 1 1/4". No more job interruptions as you fumble in the tool box for another wrench. Works on both metric and standard, with ratchet action for hard-to-reach places. Even loosens damaged or rusted bolts that ordinary wrenches won't fit. Imagine the money you'll save by NOT having to purchase an expensive tool for every size nut! Set of two wrenches in both standard and heavy-duty are molded from rust-resistant, chrome-plated steel. A must in every tool box—at home, shop, office! Guaranteed for life by the manufacturer.

Sold nationally for \$29.99!

HEAVY DUTY  
Fits 23-32mm  
(7/8" - 1 1/4")

REGULAR DUTY  
Fits 9-22mm  
(3/8" - 13/16")

As Advertised on TV

PLACE YOUR ORDER NOW, CALL TOLL-FREE: 1-800-821-8011

Send \_\_\_\_\_ sets of Master Wrenches at \$14.99 ea. plus \$3.00 ea. for postage and handling.  
Check or money order enclosed MasterCard VISA

In Missouri Call (816) 454-7660

Acct. No. \_\_\_\_\_ Exp. \_\_\_\_\_  
Name \_\_\_\_\_ Phone \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

8601 N.E. UNDERGROUND DR., KANSAS CITY, MO 64161

MasterCard VISA  
Use your credit card to order.  
**Q PRODUCTS**



# STIRLING CYCLE ENGINE ASSEMBLY KIT KIT FOR A WHAT?



Stirling Cycle Engines were used as a prime source of power throughout the 19th century. Today, the average person has not heard of this principle.

## Heat is the only fuel required!

This easy to build Kit will amaze and intrigue those that see it run at speeds up to 1000 R.P.M. ONLY COMMON HAND TOOLS and your time are required to complete this Desk-Top Model Engine. This all metal, precision machined kit is complete, including fuel platform, dry fuel, assembly instructions and plaque to identify the builder. This attractive miniature Engine measures 7½" x 4".

- Safe
- Silent
- Easy to Build

## ORDER YOURS TODAY

**Solar Engines • 4020 E. McDOWELL RD., PHOENIX, AZ 85008 U.S.A. (602) 273-6191**

Enclosed: ☐ Check ☐ Money Order ☐ VISA

Charge My: ☐ American Express ☐ Master Charge

Please send me: \_\_\_\_\_ Assembly Kits @ \$38.00 \$

Domestic Shipments: Price of Kit includes shipping via United Parcel Post.

SIGNATURE \_\_\_\_\_

NAME (PLEASE PRINT) \_\_\_\_\_

M.C. INTERBANK NO. \_\_\_\_\_

CARD NO. \_\_\_\_\_

EXPIRATION DATE \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

CREDIT CARD BUYERS DIAL: (800) 528-6048

## DRESSED TO KILL

(Continued from page 175)

plaining that face guards made them anonymous to the fans. By the 1960s, most teams issued face guards to all players. Many variations have come onto the scene since then. There's the single or double bar that covers the lower nose, mouth and jaw. The elongated double bar covers the upper nose down to the chin and has become popular with defensive players.

With the advent of composite materials, helmet manufacturers have been able to make elaborate cages, such as the bird-cage or the cowcatcher types, which place a grid of protective material over the entire face while leaving wide slits so the player can see who he's up against.

The boxing world has contributed mouth guards to the supposedly more docile sport of football. The trainer takes a wax impression of a player's mouth and sends it to the mouth-guard manufacturer for a device that fits the individual perfectly, protecting his teeth. In an age of toothpaste ads and other commercials emphasizing good looks, no player wants to risk a broken tooth.

## Bigger and faster

Space-age plastics have transformed the pro football player from a heavily laden behemoth to the modern mean-and-lean image. And the equipment promises to keep getting leaner. The players are getting bigger and faster with each passing decade. In the 1950s, the average NFL player weighed 210 pounds. Today's average player, according to figures published in *Pro Football* magazine, is over 230 pounds. The speeds at which they move are dazzling. Linemen who weigh 270 pounds have been timed in the 40-yard dash at 4.9 seconds. The greater bulk and higher collision speeds call for improvements in the armor, and football insiders say they're coming.

The biggest breakthrough will probably be in attachment of face protectors to helmets. Some experimental helmets being tried on the field this year come with face cages that break off with some ease but can be reattached right on the field.

"I've seen players tear off an opponent's face mask," Klecko says. Such violence often results in neck and shoulder injuries. The easy-off, easy-on cages will reduce those injuries.

The one thing science hasn't been able to provide football players with is a sure way to go through a whole season without a major injury. Klecko, who sat out most of 1982 after knee surgery, says "I'd give the Nobel Prize to the guy who came up with that."

PM

FACTORY DIRECT

## AIR BEDS FROM \$19.95



IT'S TIME YOU TRIED SLEEPING ON AIR. Your back and joints don't ache in the morning because of less pressure. You don't toss and turn as much and you generally sleep deeper and more restfully because of less body movement. Air-cushioned comfort provides a better night's sleep as opposed to lying on a mattress of rigid metal springs.

**GENUINE AIR COIL CONSTRUCTION**...Herein lies the "magic." These "Controlled Air Chambers" are what support you when lying, sitting, or just lounging. You (and your sleeping partner) don't sink down in the middle. Instead you are both securely supported at all times in maximum comfort and stability. Also, a **Perfect Portable Spare Bed** inflating in minutes with an air pump or canister vacuum cleaner. Rich Camel color comes with or without VELVETEEN suede-like finish. 90 day limited replacement warranty.

MAIL COUPON WITH ORDER

**SHOP FASTER BY PHONE**  
**1-805-966-7187**

Or send a check, or credit card # (Diner's Club, VISA, MasterCard, Am. Express) for Air Bed specified. Add \$5.95 shipping & insurance per bed. CA res. add 6% tax.

Bed Size	Vinyl	Velveteen
■ Singles (29" x 72")	■ \$19.95 (#600)	■ \$29.95 (#605)
■ Twin (39" x 74")	■ 29.95 (#601)	■ 39.95 (#606)
■ Full (54" x 74")	■ 39.95 (#602)	■ 49.95 (#607)
■ Queen (60" x 80")	■ 49.95 (#603)	■ 59.95 (#608)
■ King (74" x 80")	■ 59.95 (#604)	■ 69.95 (#609)

**STARSHINE GROUP**

816 B STATE STREET, DEPT. BD-918  
SANTA BARBARA, CA 93101

145-81



## GENERAL MOTORS

(Continued from page 112)

available on the Eldorado. You can tell the real one by its less vertical rear roofline, smaller back window and chrome snaps on the molding where the top meets the body. The nifty-looking, nimble-handling (but underpowered) Eldorado Touring Coupe continues into '84 despite the fact that only a few hundred '83s have been sold.

Otherwise, Cadillac's engineering and styling changes include both the significant (standard electronic level control for DeVilles and Fleetwoods, structural improvements for Eldorados with touring suspension, better glow plugs for the optional 5.7-liter V8 diesel) and the trivial (new front park/turn signal and taillamp lenses with "gold vertically winged crests," reduced door unlatching effort). The compact Cimarron sedan gets its third new grille (a finer cross-hatch design), revised taillamps and a softer ride for '84, with optional gold-on-black D'Oro trim.

### On to Buick

Aside from the new fwd Century Estate wagon (with a standard hinged rear window that swings up separately from the big back hatch); new graphic electronic tachometers for the sporty Skylark and Century T-Types (plus beefier suspension and tires for the latter); a sinister-looking, all-black "NAS-CAR" turbo Regal coupe; and an all-white Century Olympia Limited sedan (official car for next summer's 23rd Olympiad in Los Angeles), Buick's major thrust for '84 is engines.

Biggest news is a multiport, sequential, fuel-injected (SFI), turbocharged 4.8-liter V6 engine with electronic wastegate control and a maintenance-free, computer-controlled coil ignition system that completely replaces the previous conventional distributor and coil. Standard on the Century and Riviera T-Types, it develops a very healthy 200 hp and 300 ft.-lb. of torque.

A couple of steps down on the evolutionary ladder is a nonturbo version with nonsequential (each injector fires twice per crankshaft revolution) multi-point injection. Available later in the year in Buick's Century, as well as certain other A-cars and the coming fwd C-cars, this "MPI" engine should deliver between 125 and 130 hp.

### At Oldsmobile

In contrast to Buick's very youthful T-Type models, performance V6 engines and heavy emphasis on customer satisfaction, rival Oldsmobile is GM's "business as usual" division.

Though lip service is paid to attracting younger buyers with the compact Firenza and sporty-looking ES models,

the real emphasis here seems to be on selling the same old stuff to the same old buyers. Thus the suspensions are soft, the wagons woodgrained, the tires whitewalled, the wheel covers wired, the roofs padded and almost everything heavily chromed—leading one auto-writer wag to comment that the division seems to be in a coma.

Still, the same old "luxury" formula still plays in Peoria—if not in more progressive locales: Perennial third-place-seller Oldsmobile is doing very, very well these days for a seemingly comatose carmaker. The fwd Toronado gets another new face (probably its ugliest

ever) and a new ultralux version called Caliente. The mid-size fwd Cutlass Ciera (GM's best-selling A-car), besides its new wagon version, gets a wider center pillar roofline for the coupe and a vinyl-capped Holiday Coupe model for the opera window set. Meanwhile, the 180-hp Hurst Olds, is carried over with its Hurst "Lightening Rod" triple-stick (automatic) shifter.

### Visiting Pontiac

Even Pontiac, which has been steering a steady course toward the serious enthusiast (usually import) buyer and

(Please turn to page 178)

## Enjoy the TV Fun and Thrills You're Now Missing!

**NEW! AMAZINGLY LOW COST PARABOLIC  
ANTENNA SYSTEM BRINGS YOU MICROWAVE  
PROGRAMS ON YOUR PRESENT TELEVISION SET**

**NO CABLE OR EQUIPMENT CHARGES • EASY "DO-IT-YOURSELF" INSTALLATION**



**FILMS**



**"LIVE FEED"  
SPORTS EVENTS**



**LIVE  
CONCERTS**



**RELIGIOUS,  
EDUCATIONAL**



**DRAMAS AND  
MUSICALS**



**SPACE PROGRAM  
TRANSMISSIONS**



**AMATEUR  
TRANSMISSIONS**

Receive and enjoy a vast wealth of entertainment, educational and specialized programming — space shuttle transmissions, amateur and experimental telecasts ... Broadcasts NOT available on your present VHF or UHF channels.

MICROSAT TV SYSTEMS has been organized to make advanced hobby and experimental microwave reception equipment available to the general public at low cost. Our first product, THE PARA-20 is a high-efficiency parabolic antenna system (the design most highly regarded by broadcasters and technicians) and matching downconverter. It has been precision engineered for simple installation by anyone. No technical knowledge is required and clear, illustrated instructions assure perfect results.

**ONLY \$129.95 COMPLETE — CREDIT CARDS ACCEPTED!**

YES, that price is correct! Only \$129.95 for everything you need including cable and all hardware. Until a few months ago, you would have had to pay twice as much for one of the crudely built "coffee can" kits which gave barely visible results when installed a few miles from the nearest microwave transmitter and had to be carefully "aimed" directly at the signal source. Now, through mass production and broad-scale marketing, we can bring you a true parabolic system ... virtually a miniature copy of the professional



**ONLY \$129.95 COMPLETE  
FULL SATISFACTION GUARANTEED**

"dish" systems used by broadcasters around the world — at an easily affordable price. You can even CHARGE it to your VISA or MASTER CARD account, if you wish.

**LATEST DESIGN — OVER 20 INCH DIAMETER!**

Your dish isn't a skimpy 12" or 14" disk ... ITS DIAMETER IS A FULL 20.5 INCHES. Constructed of spun aluminum with rolled safety edge, fitted with ultra-sensitive probe. It will withstand 85 m.p.h. gale force winds. Easily mounted on roof or in attic, it provides relatively broad range reception of high quality signals in primary and many "near-fringe" areas. (30" model also available for extended range reception.) It may be installed wherever an unobstructed "line-of-sight" path from transmitting stations is available.

**IMPORTANT:** Equipment offered is sold ONLY for home reception of hobby, experimental, non-commercial and similar signals NOT protected or restricted by FCC rules and regulations. In placing order, customer agrees to abide by such regulations as currently apply or may be invoked and releases MICROSAT TV SYSTEMS from any and all responsibility for possible misuse.

**• NOT SOLD FOR INTERCEPTION OF SUBSCRIPTION TV SERVICE •**



**NOTE:** Variety and types of programming available in your area for unrestricted viewing depends upon local telecasters' individual policies and license authorizations.

**MICROSAT TV SYSTEMS, 960 Lakeside Rd. (Box 5426), New Hyde Park, NY 11040 Dept. MM-202**  
(A Division of LATTING TOWN GROUP Ltd.)

Gentlemen: Please RUSH me \_\_\_\_\_ MICROSAT PARA-20 antenna systems at \$129.95 plus shipping and handling. (List unit \$3.99; each additional unit \$3.99)

☐ I prefer the MICROSAT PARA-30 system to extend reception area and assure improved signal quality at \$179.95 (plus \$8.50 ship., handling.)

In ordering this equipment, I attest that it is to be used solely for non-commercial purposes in reception of signals NOT restricted by FCC rules and regulations.

Signature \_\_\_\_\_

PRINT NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

ZIP \_\_\_\_\_

☐ CHECK ENCLOSED  
☐ VISA ☐ MASTER CARD  
(Bank No. \_\_\_\_\_)  
☐ AM. EX. ☐ DINERS CLUB  
Card No. \_\_\_\_\_  
Expiration Date \_\_\_\_\_

**SATISFACTION GUARANTEED OR PURCHASE PRICE (less 15% service charge) REFUNDED if returned complete, including all hardware, within 30 days.**

(NY ONLY: Include 4% State tax plus local tax, if any)

**DEALER INQUIRIES INVITED. Write or Phone 516-352-7000**



## GENERAL MOTORS

(Continued from page 177)

away from the hardcore chrome and woodgrain types, is starting to backslide into its old unsuccessful ways.

The division said it would never bring back its full-size car, but it did a half-year ago (the Canadian-built, Chevy-bodied Parisienne). It promised no tacky vinyl roofs and such on the cleanly-chiseled 6000 A-car, but breaks that promise for '84.

It was criticized for having no tachometer in the otherwise near-perfect (and highly successful) 6000 STE performance sedan, yet comes back for '84 with a Japanese-style, full digital-graphic dash for '84—thereby moving the STE further away from the serious enthusiast for whom it's intended. Even the much-improved 2000 J-car is now the "2000 Sunbird." (Next year, it'll probably be just Sunbird.) All this is probably due to pressure from the dealer salespeople, who apparently have never understood the division's long-term program or the "new-values" buyer Pontiac has been courting.

On the positive side, Pontiac has one of the industry's hottest new engines for '84—a turbocharged, port-injected version of the 2000's 1.8 liter overhead-cam Four that's rated at 150 hp.

It's standard in new performance-version SEs and optional across the 2000 Sunbird line (including the convertible), as well as in Buick Skyhawk T-Types. Curiously, the sexy STE-like SE front end also graces the luxury-version LE Sunbirds, which seems to me to dilute its performance-image impact. The super-sleek Firebird line gets a new 190-hp optional Trans Am engine.

### Last stop: Chevy

Chevrolet Div. finally seems to be revving its creative engines after years of self-imposed lethargy. Among other evidence, the J-car Cavalier sports a handsome new face and a sporty Type 10 coupe version, while the A-car Celebrity line adds very handsome, cleanly trimmed Eurosport models.

Significantly, Chevy's beautiful Eurosport wagon is the *only* sexy version of the new A-car wagon in the whole corporation. The NASCAR homologation-special Monte Carlo SS, with its aerodynamic nose, 190-hp V8 engine and new front bucket seats, returns for '84, the full-size Caprice coupe is revived by popular demand and the marvelous Corvette now has a cut-out switch for its manual-gearbox overdrive system.

Finally, do yourself a favor and check out an '84 Camaro Berlinetta next time

you're in your local Chevy store. You don't have to drive it; just sit in it and play with its fascinating instrument and control panel. Flanking its digital/graphic instruments and electronic systems monitor are twin pods housing finger-reach pushbuttons for everything from lights to wipers to heater/AC adjustments, similar to those in Isuzu's Impulse. There's also a remote, swiveling-head, pushbutton stereo radio with graphic indicators for bass, treble, balance and fade, plus an overhead console with a map light, a storage pouch and a removable battery-powered flashlight. Significantly, this spaceship-like Camaro cockpit debuts in the high-lux Berlinetta, *not* in the high-performance Z28.

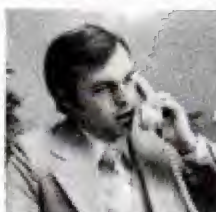
If GM '84 is notable for what it offers—a hearty course of American-style steak-and-potatoes luxury, comfort and convenience served up with tantalizing side dishes of '60s-style performance and '80s-style Eurofashion—it's notable, too, for what it doesn't offer—a low-calorie dessert of modern, high-tech, high-efficiency power train. Where are the state-of-the-art, domestically produced new engines and trans-axes GM's new-generation fwd fleet still needs so badly to remain competitive through the '80s and '90s? Maybe next year? **PM**

# 36 ways to help you qualify for the job you want!

## FREE CAREER FACTS ABOUT DIPLOMAS AND TWO-YEAR DEGREES

Send for free facts and color brochure to find out what career training in the field of your choice might do for you—no obligation to buy anything now or ever. Now at home in your spare time, you can train for a money-making career...even get a Two-Year Degree if you want...to help you get a better job. Find out everything you need to know about any one of these 36 career programs—with no obligation to buy anything, now or ever, and no salesman will call. Just check the one program that interests you most. You will receive free facts, color brochure and information on employment opportunities in the field you choose. Mail coupon today and see how easy it is to train at home for a great new career or advancement on your present job.

**Open Book Exams...Adult Training**  
Your diploma or Two-Year Degree is given to you for what you learn—not what you memorize. We send lessons and training material to your home. You decide when you are ready to take each "Open Book" exam. Then mail it to your instructor. Graded papers are returned to you with comments when needed to tell you how to correct your wrong answers. "Open Book" exams have proven so successful for adults, they are now used in many colleges. Our graduates tell us they like our method of independent study because it's so convenient and easy to do. You choose your own study hours in the privacy of your own home. You move



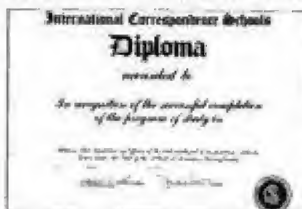
ahead one step at a time, as fast or as slow as you want. And every Diploma or Two-Year Degree is fully accredited.

### An Ideal Way to Learn

You waste no time traveling to and from class. And you never have to miss a paycheck. Skilled instructors are ready to help you at any time.

You get the same high-quality training that ICS has been known for since 1891...the same kind of training program that's offered by giant companies to their employees...corporations like Union Carbide, International Paper, Bethlehem Steel, United States Steel, etc. And note that if you wish, ICS will keep your employer informed of your progress if you feel it can help you toward a better job, or an increase in salary.

No one can promise success but if you want more security, more day-to-day satisfaction and



more of a future, send for free facts and the color brochure of your choice. There is no obligation and no salesman will call.

**Could a Career Diploma Help You Earn \$25,000 to 100,000 More in Your Lifetime?**

Compare your present salary with the

amount of money you could be making in any one of the careers listed below. Electricians average \$11.25 an hour, auto mechanics over \$8.00 an hour. And it's not only the money, but the fun of working in a job you like.

### Could a Two-Year Degree Be Worth Thousands of Dollars to You?

A two-year degree that gives you an Associate in Specialized Business or in Specialized Technology could make a giant difference in your lifetime earnings compared to the average earnings of a high school graduate. Check the degree or career course you are most interested in and...

**Mail coupon today for free facts and color brochure.**



**International Correspondence Schools, Dept. PBS93**  
ICS Center, Scranton, Pennsylvania 18515

Please send me free facts, color brochure and full information on how I can study at home for the career I have chosen. I understand I am under no obligation and no salesman will call. **CHECK ONE BOX ONLY!**

#### TWO-YEAR BUSINESS DEGREE PROGRAMS

- ☐ Business Management
- ☐ Marketing
- ☐ Finance
- ☐ Accounting

#### TWO-YEAR TECHNICAL DEGREE PROGRAMS

- ☐ Civil Engineering
- ☐ Mechanical Engineering Tech.
- ☐ Electrical Engineering Tech.
- ☐ Electronics Technology
- ☐ Fashion Merchandising
- ☐ Auto Mechanics
- ☐ Hotel/Restaurant Mgmt.
- ☐ Surveying and Mapping
- ☐ Drafting
- ☐ Small Business Mgmt.

#### CAREER DIPLOMA PROGRAMS

- ☐ Air Conditioning & Refrigeration
- ☐ Travel Agent
- ☐ Wildlife/Forestry Conservation
- ☐ Art
- ☐ Police Sciences
- ☐ Veterinary Assistant
- ☐ Diesel Mechanics
- ☐ Electrician
- ☐ Interior Decorating
- ☐ Electronics
- ☐ Computer Programming
- ☐ Microcomputer Repair
- ☐ Income Tax Preparation
- ☐ Van/Car and Truck Customizing
- ☐ Gun Repair
- ☐ Motorcycle Repair
- ☐ Industrial Management
- ☐ Catering/Gourmet Cooking

\* These courses are offered by North American Correspondence Schools. Both ICS and North American Correspondence Schools are divisions of National Education Corporation. They are Accredited Members of the National Home Study Council.

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

**Mail coupon today for free facts and color brochure.**



# HINTS FROM READERS

## What a feat



When I couldn't find replacements to match the rubber feet that were missing from a slide viewer, I made substitutes using a length of discarded 3/4-in. outside dia. garden hose. First, I cut 1-in. squares of sheet aluminum and drilled holes in the centers for mounting screws. Next, I cut 1/4-in.-thick rings from the garden hose. Then I fastened them to the sheet aluminum with Goodyear Pliobond cement. After the cement had set, I trimmed off the excess metal with tin snips and attached the feet. The substitute feet worked as well as the two remaining original feet.—*Walter E. Burton*

## Paste brush storage



Make a storage container for soldering, paste, and other small brushes to keep them clean and to protect the bristles. A plastic 35-mm film container can serve the purpose. Cut a small X in the top of the container with a razor knife. Push the paste brush handle through the X, leaving the bristles and 1/2 in. of the handle exposed through the bottom of the lid. Snap the lid on the container and you'll be assured that the residue on the bristles won't end up on the tools in your toolbox, or on anything else.—*Richard M. Haag*

## ATTENTION LOT OWNERS: More Home for Your Money!

Over 45 Models  
to Choose From!



Have more space, more luxury features for less money. Complete it yourself. Reduce costs by \$1,000's. Curtis does the heavy, difficult framing, then supplies finishing materials with step-by-step instructions.

Don't settle for less ... you can get more home the Curtis complete-it-yourself way.

Send Coupon or  
Call for a FREE Catalog.

There's a representative near you  
Call (612) 542-4300  
or Toll Free 1-800-228-6505  
In Nebraska Call Toll Free 1-800-642-9606

Complete It Yourself

**Curtis Homes**

(612) 542-4300

If you have desire... We have the trust!

- SPECIAL CREDIT ARRANGEMENTS FOR LOT OWNERS.
- QUALITY MATERIALS AND FEATURES.
- USE OUR PLANS, YOUR PLANS, OR BEST OF BOTH.
- DISCOUNTS FOR CASH BUYERS.

Send me your **FREE** Homes Catalog  
**CURTIS HOMES, DEPT. PM-1**  
2201 Florida Ave. So., Minneapolis, MN 55426  
(Please Print)

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone ( ) \_\_\_\_\_

- ☐ We own land.  
☐ Enclosed is \$1.00 for priority handling.

## What's handier than the Air Cushion Bed? FREE Air Pillows to go with it!

### Great Giveaway Offer!

Order Your Air Cushion Bed Today and  
Get 2 Air Cushion Pillows  
**FREE!** You get a complete bedroom set for the price of the Bed! But act now—our "give-aways" are limited.



Folds and stores  
anywhere!

FOR AS  
LITTLE AS  
**\$29.95**

15 DAY  
HOME  
TRIAL!

Item	Price	Shipping
Single Size* 29 x 72	\$29.95	\$4.95
Twin Size* 39 x 75	\$49.95	\$5.95
Full Size 54 x 75	\$59.95	\$6.45
Queen Size 60 x 80	\$69.95	\$6.95
King Size 74 x 80	\$79.95	\$7.45
Optional Air Pump	\$14.95	\$1.95

Plus state & local taxes where applicable.  
\*Single Pillow Bonus

90-Day Limited Warranty

**IT'S SO EASY TO ORDER  
JUST CALL TOLL FREE 1-800-621-1203**

Air Cushion Beds and Pillows—ideal for home, camping, beach or van! They inflate easily, quickly using a hair dryer or vacuum cleaner and the supplied adapter. Each inflates in **minutes** and stores away compactly, out of sight! Spoil yourself with superb sleeping comfort and be ready for drop-in guests, slumber parties, lounging outside.

- Full support—inflate to your desired firmness
- No lumps, hard spots or squeaks
- Easy-clean, velvety suede-look surface is ruggedly durable
- Convenient air pump available—so many uses!



Stuart Marketing  
P.O. Box 1221, Morton Grove, IL 60053

in Illinois collect  
312-792-3535





# WE'RE LOOKING FOR PEOPLE WHO LIKE TO WIN.

The Air Force Reserve has immediate openings for people who can work well as part of a team. The weapons field includes regular competitions, so a winning attitude is important.

In addition to a good paycheck, you'll earn retirement credits and other benefits. So if you think you're enough of a competitor to qualify, call today.

**Call: 1-800-257-1212 Toll Free**  
**Or Fill Out Coupon and Mail Today!**  
**To: Air Force Reserve Opportunities**  
**P.O. Box 3008, Warner Robins, GA 31099**

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Prior Service? Yes \_\_\_\_\_ No \_\_\_\_\_

**AIR FORCE RESERVE**

26-307-3030



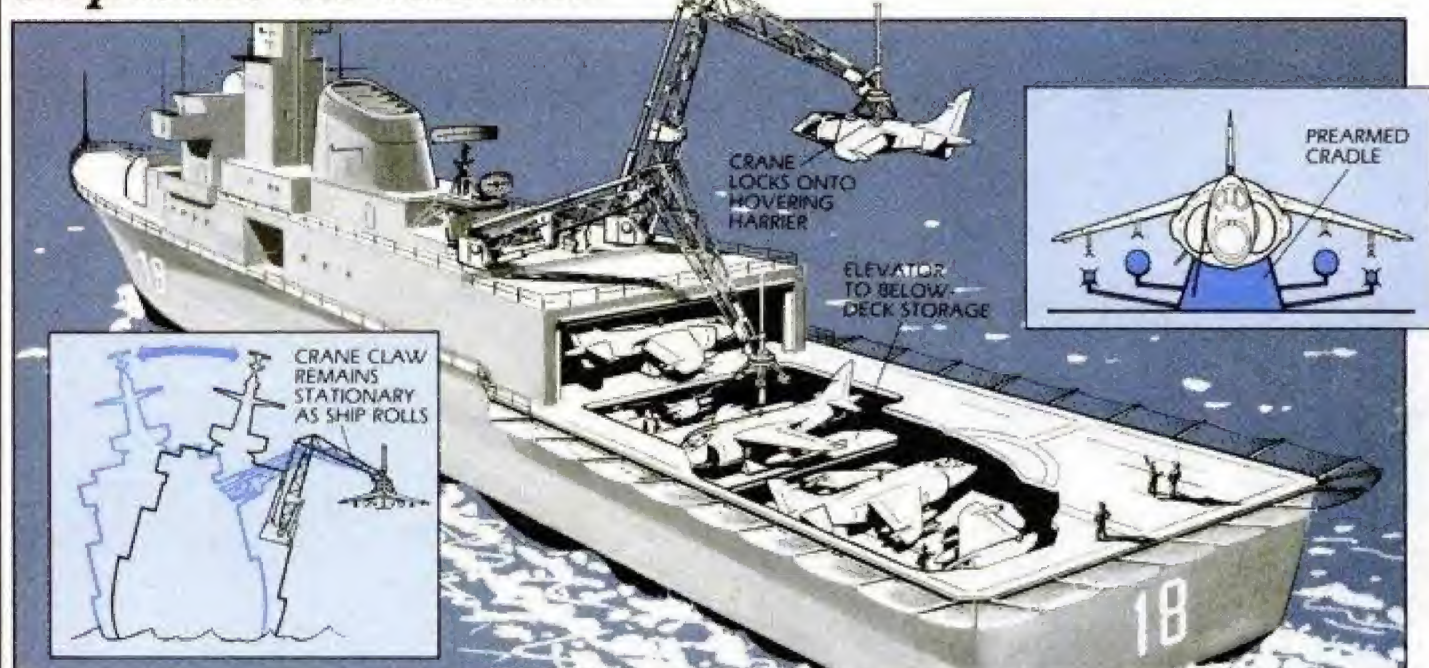
A GREAT WAY TO SERVE



# TECHNOLOGY UPDATE

## AVIATION

### Skyhooks for Harriers



**T**he British love to think up new tricks for their beloved Sea Harrier V/STOL jump jet, hero of the Falklands. Their latest idea is a lulu. Picture a small patrol vessel with virtually no deck space but two large, articulated cranes. A crane reaches out, plucks a hovering Harrier from the sky and pulls it neatly on board. To launch a Harrier, the procedure is simply reversed.

Despite the scheme's quixotic daring, it has intriguing possibilities. A large amount of a Harrier's fuel supply is used up in the hover mode during vertical landings and takeoffs when the downward-pointing thrust jets require full power. The aerial snatch is

designed to save precious fuel by reducing hover time. Also, small vessels with unreinforced decks could be used to launch and recover Harriers in place of big, expensive carriers.

Still more importantly, Harriers could be launched and retrieved in seas too rough for conventional landings and takeoffs on a heaving carrier deck. The double-jointed cranes, controlled by computers, can be programmed to flex their "elbows" in exact time with the rolling motion of a storm-tossed ship. Thus, the cranes' claws remain stationary in midair, making it easy for a hovering Harrier to hook on.

But the British don't stop there. As

each plane is lowered into the ship's hold, it's placed on a special prearmed cradle fitted with replacement bombs and missiles already in position for quick attachment. The weapons are fastened on and the plane is whisked up again to fly another mission. This way, say the British, a Harrier can be recovered, rearmed and relaunched in half the time it would normally take on a fully equipped carrier.

Called SkyHook, the system is being developed jointly by British Aerospace and Dowty Boulton Paul of England. If anyone can pull off such a caper, the British probably have just the right amount of audacity to do it.



#### EYES FOR THE DARKNESS

The infrared Maverick air-to-surface missile, troubled by guidance-system problems in its earliest tests, now appears ready for regular service on American attack aircraft. The Maverick reportedly destroyed over 90 percent of its targets in the latest tests out of Nellis Air Force Base in Nevada. In earlier testing, the Hughes Aircraft missile scored only 77 percent. The missile is designed to seek out targets in darkness.



#### SUPER BLIMP IS COMING

Construction will begin soon on Goodyear Aerospace Corp.'s high-tech entry in the airship market. Using plastic and composite materials, the GZ-22 blimp will carry nine passengers instead of the current six. A ducted, tiltable fan—in place of propellers—will allow near-vertical takeoffs and landings. The blimp is scheduled to fly late in 1985 or early in '86.



## SPACE



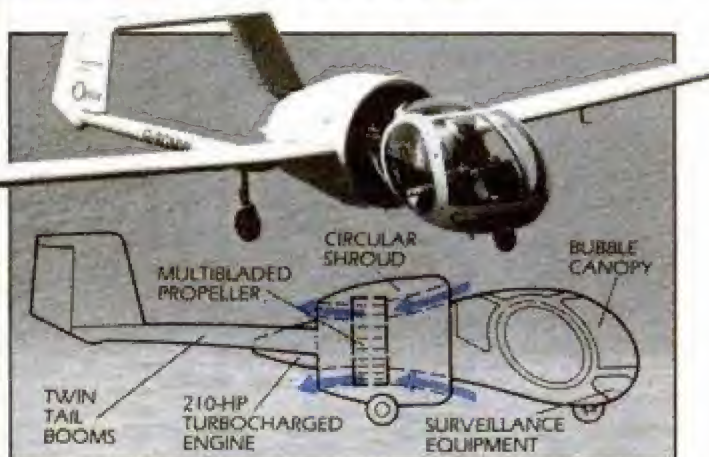
### 'Roadside' repair in space

In April 1984, astronaut George Nelson will thrust up and out of the Space Shuttle cargo bay 286 miles above the Earth. He'll be strapped into a Manned Maneuvering Unit (MMU), and the 24 tiny thruster rockets will send him zooming 100 yards above the shuttle *à la* James Bond. By

firing specific thrusters at different intervals, he'll steer the MMU around a sun-orbiting satellite being held in place by the Shuttle's robot arm. Thus, the Space Shuttle Challenger will enter the history books as the first vehicle to perform in-orbit service on a broken-down satellite.

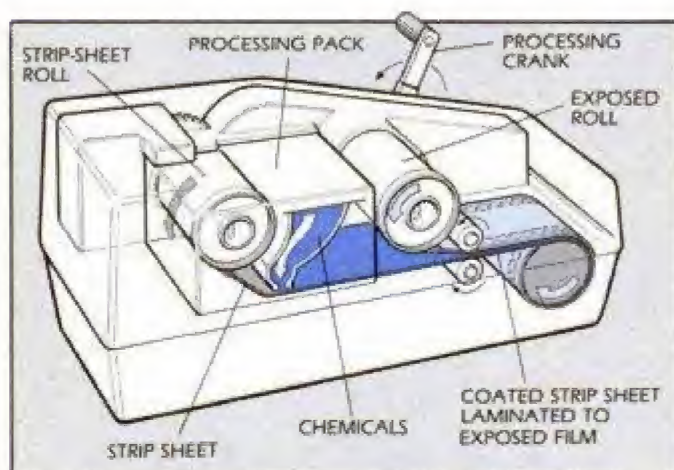
The Solar Max satellite was launched in 1980 to study the sun's 11-year sunspot cycle. A few months after launch,

## INVENTIONS



### Big eye in the sky

It looks like a monster bee from a horror flick. Actually, it's a British prototype for a new high-stealth photo/reconnaissance plane designed to offer the slow flight of a helicopter without the noise. Called the Optica, its wasp-waisted shape allows air to be drawn into a large, shrouded pusher propeller. Although it can't quite hover, it can sneak along at 50 mph and operate from short fields. It's made by Edgley Aircraft of Wiltshire, England.



### Slides while you wait

With Polaroid's new CS 35-mm color transparency film or Polapan CT 35-mm black and white film, you can shoot 36 frames in your SLR camera and have the slides mounted within the hour. It's done with the Polaroid 35-mm AutoProcessor (\$83.25) and the chemicals that come with every \$14.85 package of 36-exposure film. Slip the exposed roll into the AutoProcessor, then insert a box of dry processing chemicals. Close the box, turn a crank and a strip sheet is laminated to the exposed film. Remove the film and the exposures are ready for mounting.

Editor: Dennis Eskow

Contributors: Sheldon M. Gallagher, Robert Little, David M. Stewart





FLIGHT  
SUPPORT  
SYSTEM

Astronaut strapped to the Manned Maneuvering Unit (MMU) aims Flying Grapple as he rockets MMU into position prior to docking with the Solar Max satellite. Once docked, astronaut uses MMU's 24 thrusters to help the Space Shuttle's robot arm pull in the damaged satellite. Repairs will be made at flight support system. Then Solar Max will be reinserted in orbit.

PM art: Dean Ellis

Solar Max's roll, yaw and pitch fuses burned out, making it impossible to point the satellite at specific parts of the solar disk. Astronaut Nelson, when he reaches the steadied satellite, will use a handheld grapple to grab Solar Max and help the robot arm lower it into the cargo bay. Repairs will be made inside the bay and then the satellite will be reinserted into orbit by the Shuttle arm.

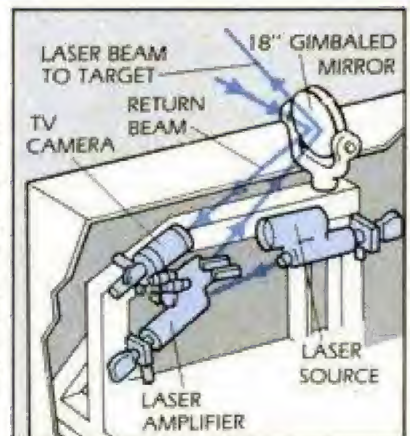
## AIR BRAKES IN SPACE

A future Shuttle may use an inflatable outer jacket instead of retro rockets to slow down for a landing. The NASA concept would save fuel. The outer bag would inflate as the craft skims the upper atmosphere. Friction would slow the craft.



## TARGET IS ON THE BEAM

To follow a target moving about 13,000 mph, you need a fast tracking device. Sandia National Labs has created a tracker that sends a laser signal to a mirror. The beam is reflected to the target, back to the mirror, then to a TV camera hooked to computers. They calculate the speed and direction of the rocket.



## Seeing without looking: New 'eyes' for pilots

**W**ith these new eyeglasses, a pilot can "see" his instruments without looking at them. Superimposed on his view are such vital instrument readings as airspeed, altitude, compass heading and artificial horizon, enabling him to concentrate on his flying without having to look down into the cockpit.

The Micro-HUD system, invented by Hubert Upton of Bell Helicopter Textron, works like the fixed head-up display (HUD) in modern jet fighters. The

advantage of the eyeglasses, however, is that the image appears wherever the pilot looks. The glasses are also lighter and less costly than a fixed HUD, making them practical for civilian use.

The information to be displayed is transmitted by a fiber-optic ribbon to a tiny mirror at the center of one eyeglass lens. The mirror, only 1 mm in diameter, is too small to be seen, but reflects the image into the pilot's eye, creating the illusion that the readings are projected out in space.

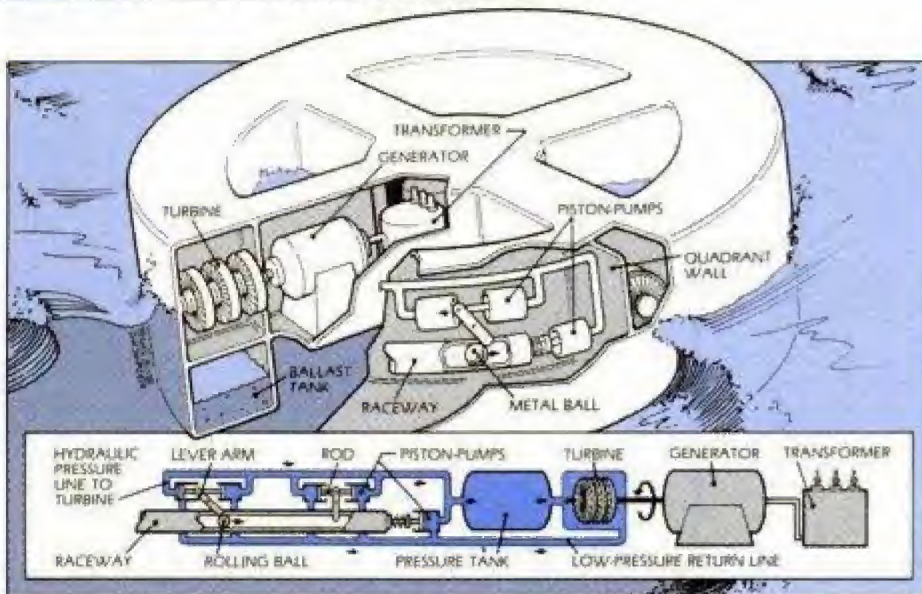
The Micro-HUD glasses were originally developed for helicopter pilots, but have many other ingenious applications. A surgeon could watch his patient's vital signs without moving his head. An engineer or lab technician could check on instrument readouts without taking his eyes off his work. A sound-sensitive version, converting speech to symbols, could enable a deaf person to "read" another's lips without even looking at them. And you thought glasses were for poor eyesight.



Wearing new glasses, pilot sees instrument readings without taking his eyes off of the sky.



## ALTERNATIVES



The Raft Energy Generator uses sea motion to move 100-pound steel balls along track.

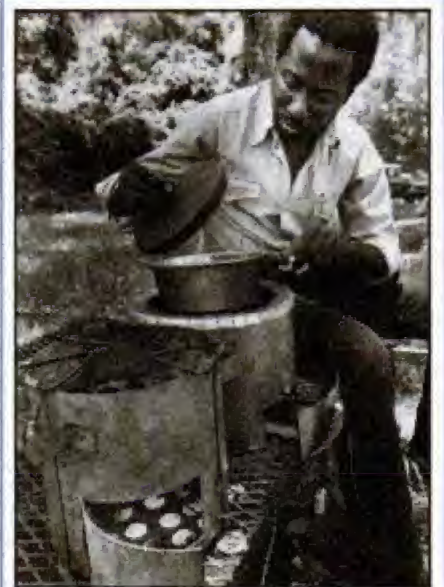
### Sea power is patented

**O**cean waves would be harnessed to generate electricity in a Raft Energy Generator patented earlier this year by Byrl and Betty Williamson of Agoura, Calif.

The huge raft would contain a series of "raceways" through which 100-pound metal balls roll back and forth with the pitch and roll of the sea. As a ball rolls down a raceway, it moves a

lever arm that pushes a rod, which, in turn, moves a piston back and forth. That motion pressurizes fluid running into a tank that turns a turbine. The turbine powers the generator itself.

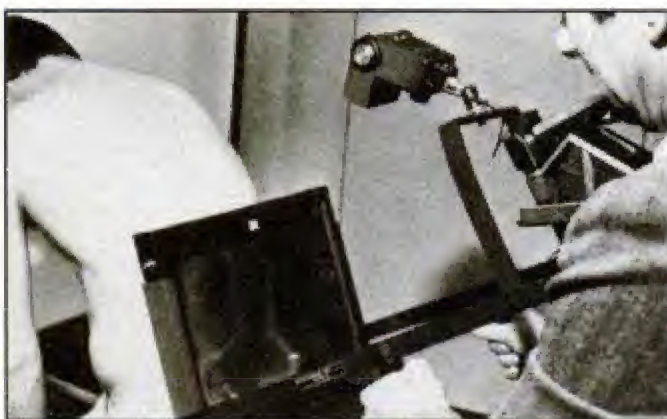
Fluid returns to the mechanical energy system through a low-pressure line. Each raceway system is contained in a quadrant of the raft to prevent balls from collecting in one place.



### THIRD-WORLD STOVE

African families frequently rely on alternative fuels, such as charcoal and dung, for cooking. But even those fuels are in short supply. At the University of Florida, Tanzanian engineer Francis Mkwa has invented a stove that can provide a normal fire with half the fuel. A metal collander holds hot coals under a metal plate recessed inside a ring of metal or ceramics. The cooking pot is then placed on top of the ring.

## MEDICINE




### Hot shots

**T**he use of thermography to detect a range of diseases in their early stages is increasing. Thermography uses a chemically treated flexible plate that changes colors with changing temperatures. The latest use was demonstrated by Flexi-Therm at a New York symposium. The thermographic plate is placed against the back. A color photo shows spots where blood may be flowing too quickly or too slowly. It should help in finding the cause of back pain.

## MARINE



### TV cameras going under

**V**ideo cameras aren't easy to protect underwater. The problem has been to keep their protection watertight and lightweight without getting any water near the optics or electronics. Westape, a Washington video development company, and Sony will introduce later this year a housing for video cameras. The solid-aluminum unit is good down to 500 feet. The news will be encouraging to researchers who would prefer video to more expensive film processing. 





# The wall plug that beats burglars.

Imagine it's 2 a.m. An intruder is prying open a window in your house. In the dark he feels safe, secure. Suddenly a bright light comes on. He doesn't want trouble. So he runs.

Did you catch the burglar in the act? No. You weren't home. The light was turned on by an ingenious sound-activated device called the AudioLite Plug. And it may be your best bargain in home security.

It's also brilliantly simple. Plug a lamp or other appliance into the AudioLite Plug. Then set the precise sound level you want to trigger the unit—from a whisper to a

countdown. So if you remain in a room, there's no interruption of light. If you leave, you don't pay for light you're not using.

**No engineering degrees necessary.**

Simply plug an AudioLite Plug into any conventional AC outlet, from your cellar to your attic—anywhere at all. Then plug a lamp or other device (up to 300 watts) into the top socket. That's it. The bottom socket remains a conventional outlet. Removing the plugs is just as fast, so you can move them around the house or take one with you when traveling.

Plug in a lamp near the stairs, and walk safely day or night. And the children can fall asleep with a comforting light that will turn itself off when they're safely dreaming.

**Light without guilt.**

AudioLite Plug works both ways, turning lights on—and off. So you save energy and money. Families with children can put a plug in every room, and in a few months the plugs will pay for themselves. During quiet activities like reading, use the manual On-Off switch. The dimmer switch on the AudioLite Plug is ideal for hallway lamps, and helps you save even more.

**Order one—or save with four.**

AudioLite Plug is UL approved, with solid-state reliability. One year warranty from AudioLite, pioneers in sound-activated switches and plugs for the home.

To see how handy AudioLite Plug is at your house, order #MSM752 for \$34. And if you've thought of several places where you'll use them, order a set of four (#MSM753) for only \$99. Use them for 30 days. If you're not delighted, simply return your order for a full refund.

Call today. Experience the magic and security of a home that responds to sound—with light.

**ORDER TOLL FREE.**

For fastest delivery, credit card holders may call toll free. Please have the product number ready. Or send your check, adding delivery charge (2.50 for one, 4.50 for four). Calif. residents, add 6% tax.

**800-344-4444**

Overseas/Canadian (415) 344-4444

**THE SHARPER IMAGE®**

406 Jackson Street, Dept. 8273  
San Francisco, CA 94111

©1983 The Sharper Image

Light sensor reduces sensitivity during daytime when conditions are noisier.

Sound-activated socket operates lights or other electrical devices up to 300 watts. Bottom socket remains a conventional outlet.

Time control (7 seconds to 7 minutes) is recessed to prevent tampering and accidental setting changes.

Light flashes when unit 'hears' sound, so you can check and adjust sensitivity with ease.

No wiring necessary. Just plug the unit into any regular outlet.

High-Low dimmer switch for energy savings and convenience.

On-Off switch lets you operate lamps and appliances manually.

Recessed sensitivity control. You set the sound level you want quickly and easily.

shout. A built-in indicator light flashes when AudioLite Plug 'hears' a sound, making it easy to adjust the exact sensitivity level you desire. During noisier daytime hours, a special light sensor automatically reduces sensitivity.

Also adjustable is the number of minutes you can make lamps stay on—from 7 seconds up to 7 minutes. Each new sound triggers the internal timer, beginning a new

Setting sensitivity and time interval is easy, too. A quick turn with a screwdriver, and you're done.

**Fun replaces fumbling.**

Home security is only the start of AudioLite Plug's services. If you've ever tripped while groping for a lightswitch in a dark room, you can see how useful a sound-activated lamp will be. Your footsteps alone can turn on the lights.



## PAINT STRIPPERS

(Continued from page 65)

pants, not shorts, when handling or using chemical strippers. Wear chemical-resistant gloves made of a neo-

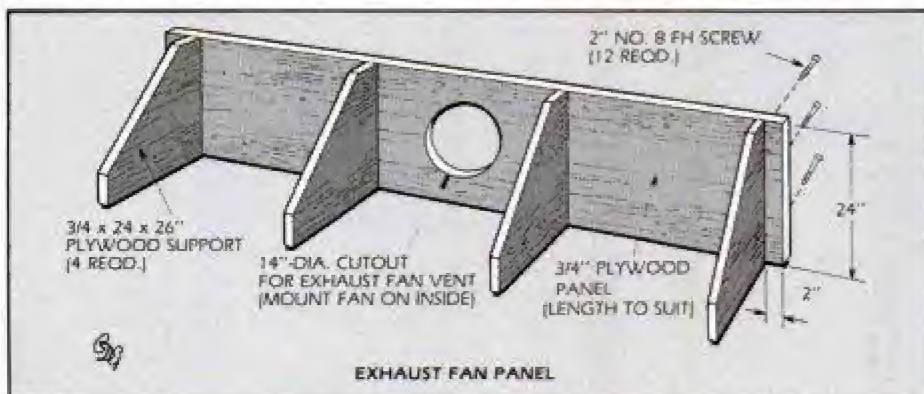
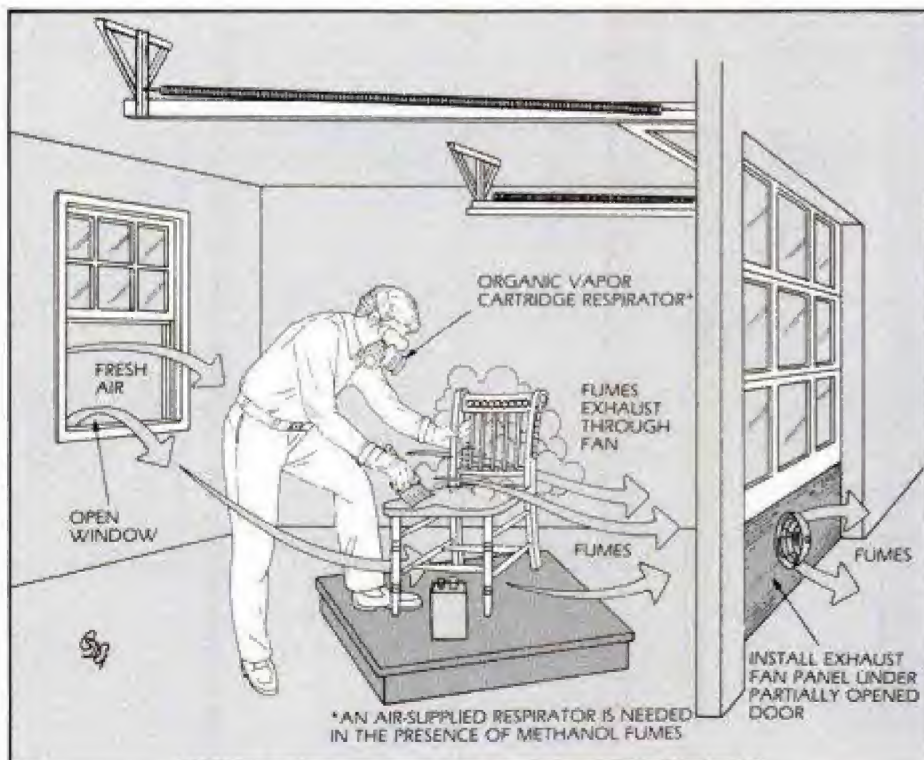
prene/latex blend and splashproof goggles, not just eyeglasses. If you're going to use steel wool, wear cotton gloves over the chemical-resistant gloves to protect them from abrasion so they'll last longer.



Wear an organic vapor cartridge respirator when you use products that don't contain methanol. Screw-on, disposable replacement filters are available.



Use an exhaust fan that's mounted in a metal frame. Secure the fan to the inside of the plywood exhaust fan panel by screwing through the metal frame.



Keep a hose or bucket of water nearby. Water will neutralize a water-based stripper's chemical action in the event of a spill. If the stripper comes in contact with your skin, wash the area immediately with soap and cool water.

Wearing a respirator is necessary when using toxic chemicals inside a ventilated workshop. Fumes from lacquers, enamels, thinners and other solvents not containing methanol are filtered safely through an organic vapor cartridge respirator. But, when using paint strippers, most of which contain methanol, you must wear an air-supplied respirator. Methanol vapors cannot be filtered through a cartridge-type respirator.

The only place you can use strippers safely without wearing a respirator is outdoors. And then, only under certain conditions.

### Proper ventilation

In recent years, the safety warnings on paint stripper containers have improved greatly, reflecting the industry's concern for consumer safety. But even the improved warnings advise only that the contents be used in adequate ventilation. What is "adequate" ventilation?

To many people it means simply opening a window or door. But adequate ventilation really means continuously replacing exhausted air with fresh air. The recommended rate of air flow is 10 to 15 complete room exchanges per hour.

Using paint removers indoors—To safely refinish furniture indoors, set up a ventilated workshop as illustrated. Build the exhaust fan panel to obtain the recommended air exchange rate. A fan with an air delivery rating of at least 500 cu. ft. per minute will provide safe working conditions in the average-size one-car garage.

Raise the garage door and position the exhaust fan panel in the doorway. Then, close the garage door until it rests on top of the panel. Some strippers and solvents produce flammable vapors, so be sure to use a fan motor with an explosion-proof rating. This rating doesn't mean that an explosion can't occur, only that the motor housing will contain the blast and not blow apart.

Before applying the stripper, open a window or door in the back of the garage to admit fresh air. Then, turn on the exhaust fan at least 15 minutes ahead of time to start the air circulating. Always work directly in the path of the circulating air. Stand "upwind" from the project when applying the stripper, and wear a respirator.

Stripping paint outdoors—Whenever possible, use paint removers and other

(Please turn to page 188)



# SOTZ GARAGE SHOP HEATER

**Burns over 24 hours**

**TRY A SOTZ HEATER FOR ONE YEAR AT OUR RISK!**

- Produces more heat than 2 or 3 high priced woodstoves.
- Tremendous radiating surface area gives you more heat with less wood.
- Airtight design and draft control engineered to limit the amount of oxygen entering stove for controlled, safe, efficient heat. Prevents over-firing so drums can't burn up.
- Lifetime tapered, formed self-adjusting door and frame seal. No dusty asbestos gaskets to replace.

Thousands in use by U.S. Army, Navy, Dept. of Nat. Resources, Agriculture, Federal, state and local government agencies.

	PRICE: DELIVERED TO YOUR DOOR	FACTORY PICK-UP
30-Gal. - Bottom	\$30.94	\$26.94
55-Gal. - Bottom	38.93	34.92
Top Kit fits both	20.93	17.92

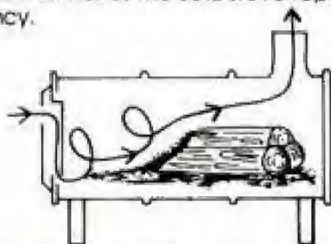
(Drums Not Supplied)

VISA and MASTERCARD RUSH ORDERS  
CALL 1-800-321-9892  
(Inside Ohio CALL 1-216-236-5021)  
or SEND CHECK OR MONEY ORDER...  
Sorry, no C.O.D.'s

**SPECIFICATIONS:** Door, door frame, flue collar, draft control, internal draft channel of 13 ga. steel legs 1/8 in. steel hinges, latch, catch of 3/16 in. steel nuts and bolts. Top Drum, Connector flanges, pipe assembly, 4 nesting brackets, nuts and bolts



Patented INTERNAL DRAFT CHANNEL-Air entering top draft control is preheated as it is drawn down inside of door and is sucked into bottom of heater with a turbulent action, mixing with the wood gases. This makes the Sotz stove tops in efficiency.



**SPARK-PROOF DESIGN . . .** Because of our internal draft channel, hot sparks cannot jump out of heater as in others with draft straight open to fire.

**\$34.92** 55-Gal. bottom kit factory pick-up

**\$26.94** 30 Gal. bottom kit factory pick-up

Kit converts 55 gal., or 30 to 15 gal., drum (not supplied) into high capacity stoves.

You've seen our ads and read unsolicited testimonials from folks just like you for many years. Before you spend \$400 to \$500 on a wood heater, try a **SOTZ HEATER** kit. If (within one year) you don't agree it outperforms any wood heater money can buy or (within 10 years), if the kit cracks, warps or burns up, your money will be refunded, including shipping charges.

Use of draft control allows you to heat large or small areas. Basement installation heats your entire home. Great for your garage, workshop, or cabin. Top drum squeezes 60% more BTU's from heat normally lost up the chimney. Heavy steel kit bolts together quick and easy.

• ALL MODELS SAFETY TESTED TO UNDERWRITERS LAB. SPECS. BY GEISSER ENGRS.

## THE ONLY KIT SOLD

- With enough nuts and bolts to complete stove.
- Sotz Top Drum Kits include connector pipe, others don't.
- 55 Gal. Stove has king size 15½" diagonal fuel door. Less wood splitting, easier fire tending.
- 30 Gal. Sotz has bigger opening (9¼" rnd.) than other brands' 55 gal. kits.

**FREE INFO:** Add even more efficiency to the already super efficient Sotz Stove with a genuine **Coming Brand** Catalytic Combustor, easily fits existing Sotz 2-Drum Heaters. Learn about heating water, drying wood, fireplace-to-woodstove.

Sotz Inc., 13643 Station Rd., Columbia Station, OH 44028

## STARVING TERMITES

As an attorney I am a natural skeptic. While building my own passive solar house in La Grange, Kentucky, I did considerable research concerning wood stoves. After reading and studying all the information I could get my hands on, I determined that the Vermont Castings Defiant and the Franklin Scandia stove of the same design were the most efficient wood heaters on the market. I purchased a Scandia. I installed it, fired it up, and continued to shiver. It ate wood like a swarm of starving termites, and the only heat it seemed to generate was ... from my constant trips to the woodpile. After this \$441.00 mistake, I decided to risk \$50 on your double drum kit. The results are nothing short of amazing. Our owner-built house is 3700 square feet, and the Sotz stove in the basement, centrally located, easily heats the entire three story house using only about one-third of the wood previously used! The stove may not

be esthetically beautiful (according to my wife), but this is a case of "pretty is as pretty does". I also find that because of the double-drum configuration the flue temperature is considerably lower. About a month ago, faced with the necessity of splitting several cords of wood for the coming winter, and having had poor success with a regular maul and wedge, and preferring the easy way of doing things, I seriously considered a hydraulic splitter but decided to rely on your Monster maul advertisement, the truth of your advertising having been previously proven by your drum stove ads. I ordered the Monster Maul. You saved me several hundred dollars. I actually ENJOY using the monster Maul. You may now send me a set of your stove tools, poker, rake, etc.

Konrad Poth, LaGrange KY

## CONVERSATION PIECE

I operate an automobile repair shop consisting of a 2-story masonry building with a concrete floor and tin walls and ceilings.

To make matters a little damper and colder, a good sized river flows next to my back parking lot. Last year I purchased a double drum heater kit (55 gal.) I have been using it for my only source of heat and am very satisfied with it. It is very economical with its consumption of wood and a constant topic of conversation with friends and customers. I am now ordering another stove kit, a Monster Maul, a Lift-N-Saw and a set of Woodstove Tools. Thank you for your quality products and reasonable prices.

Mike Danco, Long Island, NJ

## WHY BOTHER?

Please send me the Sotz wood stove as shown in the Mother Earth News Magazine. My parents have one in their house and it works great. It heats their 7 room house easily. My uncle has one in his house also. I don't know why you bother giving a guarantee on such an indestructible product.

David Mundy, St. Ann, MO



# MUST LIQUIDATE

## At \$288.00 BELOW Dealer Cost!

### Portable! Stowable! Highway approved!

# Folding Trailer

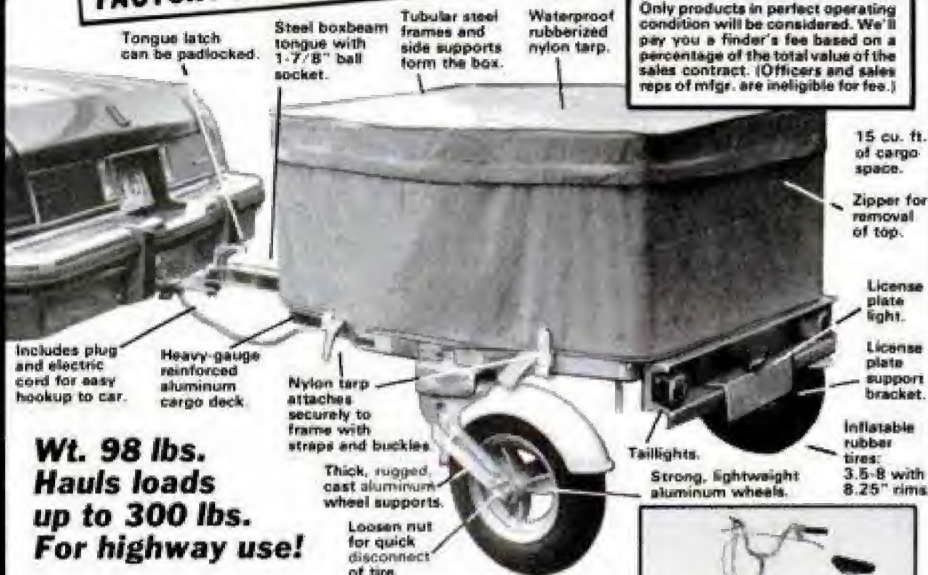
**FACTORY NEW! FACTORY PERFECT!**

## PUBLIC NOTICE!

### Finder's Fee Paid For Liquidation Inventories!

We are authorized liquidators of consumer products that must be quickly sold at drastic price reductions for reasons such as:

Overproduction. Last year's models. Economic recession. Out-of-season products. Bankruptcy or other financial problems. Order cancellations. Plant closings, etc. If you know of any company with surplus inventories that must be quickly liquidated for cash, please us Toll-Free: 1-800-328-0609. Only products in perfect operating condition will be considered. We'll pay you a finder's fee based on a percentage of the total value of the sales contract. (Officers and sales reps of mfr. are ineligible for fee.)



**Wt. 98 lbs.**  
**Hauls loads up to 300 lbs.**  
**For highway use!**



Unique, compact design. Wheels fold in, trailer deck folds down like a suitcase.



Fold to 40" x 22" x 5 1/2". Weighs only 57 lbs. Accessories (41 lbs.) are carried separately.



Includes special metal racks for hauling TWO bikes, safely and securely.

## Assembles easily and securely WITHOUT TOOLS!

### Folds down to fit in your car trunk!

A distributor's overstock now makes these strong, folding trailers available to you at an amazingly low liquidation price! This unique trailer can haul loads up to 300 lbs., and then fold down for storage in a car trunk, on a garage wall, or in an apartment storeroom.

It assembles easily, in minutes, **WITHOUT TOOLS!** You get a pair of sturdy wheels with inflatable rubber tires. Steel tongue for 1-7/8" trailer hitch. Brake lights, parking lights, turn signals, license plate light. Plug-in electric cable for easy hookup to car. Waterproof, zippered nylon tarp. Quick assembly, tubular steel box frame. Elastic cord for strapping down cargo. Special rack for hauling TWO bikes.

### Licensable in all states! Highway approved!

Designed for highway travel. Comes with mfrs. statement of origin (title card) for license registration. Made in France, this unique folding trailer features excellent engineering throughout! Made of strong but lightweight aluminum. So downright practical and useful you'll be mighty glad you have it! Use it to haul furniture and bulky equipment. For camping supplies or Little League gear. For big appliances, nursery stock, building supplies. But hurry! Our supply is limited. Order promptly before they're all gone!

40" x 43 1/2" deck, 18" box height, 36" overall height with wheels. 70 1/2" long with tongue. The weight at tongue hitch is 73 lbs. Fits onto 1-7/8" trailer hitch ball. (Car trailer hitch NOT included.)



Credit card members can order by phone, 24 hours a day, 7 days a week.

**Toll-Free: 1-800-328-0609**

If busy signal, or if no answer, call:

**Toll-Free: 1-800-328-5727**

In Minnesota, call: **1-800-742-5685**

# C.O.M.B. Co.

THE NATION'S LARGEST AUTHORIZED MAIL ORDER LIQUIDATOR OF CONSUMER PRODUCTS  
6850 WAYZATA BLVD. • MINNEAPOLIS, MN 55426

Manufacturer's  
Suggested Retail  
**\$595.00**

OUT THEY GO AT ONLY:

# \$188

Price subject to change after 60 days.  
Offer void outside original 48 states.

C.O.M.B. Co. / Liquidators Dept. F-161-61723  
6850 Wayzata Blvd. / Minneapolis, Minn. 55426

Send me \_\_\_\_\_ Folding Trailer(s) at \$188 each. I will pay shipping charge to driver upon delivery. (Allow 3-4 weeks for delivery. Add 2-3 weeks extra if paid by check. Sorry, no C.O.D. orders. Minn. residents add 6% state sales tax.)

☐ My check or money order is enclosed.  
Charge my: ☐ MasterCard ☐ VISA ☐ Am. Ex. ☐ Diners Club

Acct. No. \_\_\_\_\_ Exp. \_\_\_\_\_

PLEASE PRINT CLEARLY

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ ZIP \_\_\_\_\_

Phone \_\_\_\_\_

Sign here \_\_\_\_\_

Rural Route Customer: If truck carriers do not normally deliver to your home, include note with this order stating town address of nearest store, friend or truck terminal to ship to.

## PAINT STRIPPERS

(Continued from page 186)

strong solvents outdoors. But simply being outside doesn't guarantee proper ventilation. Certain precautions must be followed here, too.

Wait for a day that's cool and breezy. Using toxic chemicals on hot, humid, windless days can be as dangerous as working in a closed room. Always work in an open, windswept, area—ideally between 65° and 75° F. Never work in an area that's closed in by fences, buildings and other obstructions. Stand upwind to avoid breathing the vapors.

After applying the paint remover, place the piece in a shaded area. Direct sunlight will speed the evaporation of the stripper and reduce its effectiveness.

To avoid the possibility of spontaneous combustion, spread out all work rags containing paint remover until they're dry. Then, dispose of the rags into a fireproof, airtight container.

The methods described here are intended for the occasional user exposed to low levels of paint-remover fumes. For industrial and professional safety standards, consult NIOSH and OSHA guidelines. **PM**

## MANUFACTURERS LIST

### Removers

W.M. Barr & Co., Box 1879, Memphis, Tenn. 38101;  
Klean-Strip paint removers.  
Formby Inc., Box 667, Olive Branch, Miss. 38654;  
Homer Formby paint remover.  
Master Products Inc., Box 274, Orange City, Iowa 51041; TM-4 paint, varnish and stain remover.  
McCloskey Varnish Co., 7600 State Rd., Philadelphia, Pa. 19136; spray-on paint remover.  
M & M Chemical Sales Corp. and Tru-Marine Div., 515 Providence Hwy., Dedham, Mass. 02026.  
Mohawk Refinishing Products, Rte. 30 N., Amsterdam, N.Y. 12010.  
Pyrochemical Corp., 5-40 45th Ave., Long Island City, N.Y. 11101; Rock Miracle paint remover.  
Red Devil Paints and Chemicals, 30 North West St., Mount Vernon, N.Y. 10550.  
Star Bronze Co., Box 568, Alliance, Ohio 44601; Zip-Strip paint and varnish remover.  
UGL, Box 70, Dept. PM, Scranton, Pa. 18501; ZAR paint and varnish remover.

### Exhaust fans

Greenheck Fan Corp., Box 128, Schofield, Wis. 54476.  
Kord Manufacturing Co. Inc., 4510 White Plains Rd., New York, N.Y. 10470.  
Patton Electric Co. Inc., Industrial Fan Div., 15012 Edgerton Rd., Box 128, New Haven, Ind. 46774.  
H.K. Porter, 1401 West Market St., Warren, Ohio 44485.  
The Silenaire Co., Box 2468-T, Baton Rouge, La. 70721.  
United Blower Co. Inc., 334 Canal St., Box 271-A, New York, N.Y. 10013.

### Respirators

Amfak Safety Inc., 3160 Southwest 22nd St., Miami, Fla. 33145.  
Belmar Safety Equipment Inc., 212 Clements Bridge Rd., Barrington, N.J. 08007.  
Direct Safety Co., 7815 South 46th St., Phoenix, Ariz. 85040.  
Eastco Industrial Safety Corp., 26-15A 123rd St., Flushing, N.Y. 11354.  
Eastern Safety Equipment Co. Inc., 45-17 Pearson St., Long Island City, N.Y. 11101.  
Lab Safety Supply, Box 1368, Janesville, Wis. 53547.  
Major Safety Services Inc., 4500 Patent Rd., Norfolk, Va. 23502.  
Siebe Norton Inc., 2000 Plainfield Pike, Cranston, R.I. 02920.



# For less than \$1 a day you buy 5 acres of Colorado...

## A 5 ACRE VACATION HOMESITE FOR LESS THAN \$1 A DAY

A Rio Grande Ranch is your opportunity to purchase five acres of America's real estate for yourself and for your loved ones at a price you can afford.

### COLORADO'S RIO GRANDE RANCHES

The ranches are located in the heart of Colorado's beautiful San Luis Valley, surrounded by ranges of the Rocky Mountains. This is good land, level to rolling. The air is clean; the climate healthy. What a great place for your vacation homesite.

### RECREATION

Every outdoor recreation is here. Hunting for duck, elk, deer and bear. Camping and exploring in the Rio Grande National Forest. You'll find great fishing, boating. Wolf Creek Pass, Red River and Taos offer wonderful skiing and winter sports. Yes, the San Luis Valley is truly a scenic and recreational wonderland.

### ALL THIS AND CIVILIZATION TOO!!!

The towns of Alamosa and San Luis are friendly neighbors with stores, supermarkets, schools, churches and medical facilities. Alamosa is the home of Adams State College, one of Colorado's leading institutions of higher education.



### OUR REFUND PLAN

All Rio Grande Ranches buyers have a 100%, unconditional, one year money back guarantee. Upon written request, within 1 year from the date of your contract, we will refund all monies paid for the property; including interest, principal and taxes.

### THE PRICE IS LOW—SPECIAL FINANCING IS AVAILABLE

Just \$695 per acre in 5 acre parcels; full cash price \$3475. SPECIAL FINANCING, NO down payment; interest at 8% (APR), 219 monthly payments of \$30 and one payment of \$9.26, total deferred price \$6,579.26.

### REMEMBER THIS IS ACREAGE

Not just a little plot of land; your 5 acres is equal to 20 city lots, contains 217,800 square feet of land and can be yours for less than \$1 a day, just \$30 a month.

### ACT NOW—RESERVE YOUR RANCH

Return the reservation form and a 5 acre ranch will be reserved in your name. NO obligation, NO salesman will call, so act NOW; mail to Rio Grande Ranches, Box 600, Alamosa, Colorado 81101. Risk factor; since land values are uncertain you should consult a qualified professional before purchasing.

Obtain the property report required by Federal law and read it before signing anything. No Federal agency has judged the merits or value, if any, of this property.

### RIO GRANDE RANCHES / BOX 600 / ALAMOSA, COLORADO 81101

YES, RESERVE a 5 acre Ranch for me. I understand I am under no obligation to purchase and that no salesman will call. Please rush me complete details, purchase contract and map showing the exact location of my property.

THIS OFFER IS SUBJECT TO ALL LOCAL, STATE AND FEDERAL REGULATIONS.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE & ZIP \_\_\_\_\_

A statement and offering statement has been filed with the Secretary of State of the State of New York, the filing does not constitute approval of the sale or lease or offer for sale or lease by the Secretary of State or that the Secretary of State has in any way passed upon the merits of such offering. A copy of the offering statement is available, upon request, from the Subdivider. (NYA-NO. 81-260).

NP-15-83



# YOU SAVE

## UP TO 35-45% ON BUILDING COSTS WITH WEATHERBILT!



Residence



Duplex



Triplex



Quad



Commercial



Vacation

**It's true!** You may be able to save up to 35-45% (even more if you're a DIY) on building costs for homes, duplexes, triplexes, quads, condos, warehouses, sportcenters, motels, stores, office buildings, and lots more...Because our residential and commercial buildings save money for consumers, builders, and investors alike!

### Check our advantages:

- R-30 insulation in ceilings and sidewalls
- Represented in more than 30 states
- All wood trusses
- Models available to see
- Plans that meet or exceed FHA/VA specifications, and ready for filing with your lending institution.

**Yes!** I want to save up to 35-45% on building costs! Send material I've checked below:

- ☐ Brochure of many models & floor plans ..... \$7.95
- ☐ One single blueprint of ☐ Residence ☐ Duplex ☐ Triplex ☐ Quad ☐ Commercial ☐ Vacation ..... \$14.95
- ☐ One complete set (4 copies) of ☐ Residence ☐ Duplex ☐ Triplex ☐ Quad ☐ Commercial ☐ Vacation ..... \$45.00 (HUD/FHA Bulletin No. included)
- ☐ Brochure & single blueprint of all models shown above ..... \$69.00

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE / ZIP \_\_\_\_\_

Tennessee residents please add 6.75% sales tax.  
Send check/money order to: Weatherbilt Homes,  
251 S. Willow Ave., Cookeville, TN 38501

☐ VISA ☐ MC \_\_\_\_\_

Expiration Date \_\_\_\_\_

**WEATHERBILT**  
251 S. Willow Ave./Cookeville, TN 38501/615-528-2802

## ENERGY SIEVE

(Continued from page 52)



A fireplace insert turned the fireplace in the family room from an energy waster into an effective heat source. It can contribute up to 50,000 B.T.U.s of heat an hour.

distances. The heat system is the focus of another possible future project that calls for using the present electric baseboard heaters as supplemental heat and installing a heat pump in the attic over the central living area. Ductwork would run through the attic. The heat pump might also hook up to the water supply for hot water.

However, before this homeowner plans more projects, he wants to compare energy usage from the winter of '81 (before buttoning up this energy sieve) and the winter to come. We'll report back next spring. **PM**

### SUPPLIERS

**Fireplace insert:** Ironwood from CWC Textron Inc., Box 4347, Muskegon Heights, Mich. 49444.

**Vented propane heater:** Empire Stove Co., 918 Freeburg Ave., Belleville, Ill. 62222; tank and installation: Utility Propane, 1 Elizabethtown Plaza, Elizabeth, N.J. 07207.

**Attic insulation:** Knauf Fiberglass, 240 Elizabeth St., Shelbyville, Ind. 46176, unfaced fiberglass.

**Foundation insulation panels:** Thermboard from Omni Energy Products Inc., Box 220, Albuquerque, N.M. 87103.

**Wall insulation panels:** Thermax from Celotex Corp., Box 22602, Tampa, Fla. 33622.

**Basement ceiling insulation:** Johns-Manville, Box 5108, Denver, Colo. 80217, fiberglass batt with vapor barrier.

**Interior louver-look doors:** Model M1511 from CE Morgan Co., Box 2446, Oshkosh, Wis. 54903.

**Storm doors:** J.C. Penney, 1301 Avenue of the Americas, New York, N.Y. 10019, Model R904C4751B shown.

**Steel replacement entry door:** Stanley Door Systems, 1225 East Maple St., Troy, Mich. 48064.

**Interior storm windows:** Plaskolite Inc., Box 1497, Columbus, Ohio 43216.

**Outlet and switch plate insulators:** Snapit, Cable Electric Products Inc., Box 6767, Providence, R.I. 02940.

**Attic stairs cover:** Energy King, Box 1037, Wappingers Falls, N.Y. 12590.

**Water heater jacket:** S & S Industries Inc., Box 17087, Nashville, Tenn. 37217, Thermo Saver.

**Weatherstrip:** Frost-King casement window weatherstrip, Thermwell Products Co. Inc., 150 East Seventh St., Patterson, N.J. 07524; 3M reusable tubular weather strip (for patio doors) and 3M garage door bottom seal, 3M Household and Hardware Products Div., 223-1N, 3M Center, St. Paul, Minn. 55144.

**Caulk:** Convenience Products Inc., 4205 Forest Park Blvd., St. Louis, Mo. 63108 (Touch 'N Foam and Touch 'N Caulk); Dap Inc., Box 277, Dayton, Ohio 45401; Darworth Co., Box K, Avon, Conn. 06001; Geocel Corp., Box 398, Elkhart, Ind., 46515; General Electric Co., Silicone Products Div., 7540 LBJ Freeway, Suite 515, Dallas, Tex. 75251; Insta-Foam Products, 1500 Cedarwood Dr., Joliet, Ill. 60435.

NEW TOOL!

## NOW... JOIN WOOD THE EASY WAY

THE HADDON WOOD JOINER® IS THE TOTALLY NEW AND EASY WAY TO MAKE CONCEALED DOWEL JOINTS!

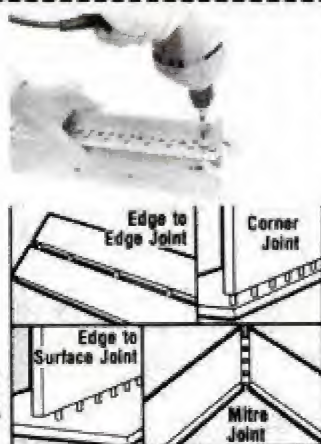
NOW, you can make edge to edge, end to end, edge to surface, mitres... any dowel joint with this special, low cost tool. No measuring, no marking... no mistakes. Saves you time, money and effort. Fast, accurate and easy!

You owe it to yourself to find out all about this NEW, money saving, money making tool. It's the world's best way to join wood!

Send for your FREE information today. You really can't afford to miss it!

HADDON TOOL\*DEPT. PM\*P.O. BOX 515\*McHENRY, IL\*60050 USA

You will be glad you did!







for part-time extra money...  
or a profitable full-time business...

# YOU'LL LIKE LOCKSMITHING!

**you learn fast... you profit fast!**

## ELECTRIC KEY MACHINE

and many other professional tools and supplies come with the course



Learn at home in spare time with the fine home study course of the original, approved **LOCKSMITHING INSTITUTE**. It's practical training. You learn by doing real jobs on all kinds of locks, working with the tools and equipment that come with the course. Every step is spelled out for you, clearly diagrammed... easy and quick to learn.

**START MAKING MONEY IN JUST A FEW WEEKS!** After the first few lessons, you'll know how to do simple jobs for pay. Do small installations, make duplicate keys, change locks. many students report spare time earnings, even while learning, that

add up to several hundred dollars extra income, just a sample of what's ahead!

**BE A MASTER LOCKSMITH IN 6 MONTHS!** Upon completion of the course, you receive the Approved Diploma that certifies you as a Master Locksmith, qualified to do highly professional work, either as an employee or running your own lock shop. What a hedge this gives you against unemployment, inflation, strikes or layoffs! How great to have for extra income when you retire!

**CASH IN ON THE URGENT, GROWING DEMAND!** Locksmithing work has zoomed in these days of increased crime and violence.

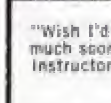
Everyone wants a locksmith... for homes, apartment buildings, cars, bikes, hospitals, vending machines, banks, businesses... wherever security is essential. As a Master Locksmith, with the professional know-how to do major installations as well as simple jobs, you will find your time well paid for... and interesting, too.

**LOCKSMITHING INSTITUTE** does not guarantee how much you'll make or be hired to do... but we do guarantee that our graduates are Master Locksmiths, qualified professionals. It's been that way since 1948. And that's a guarantee all by itself, isn't it?

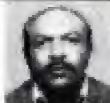
## WE LEARNED... AND WE LIKE IT!



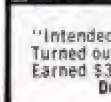
"After completing a few lessons, I started doing small jobs... earned \$500 spare time. Now earning \$100 extra per week."  
**E. E. Neel, Houston, Tex.**



"Wish I'd taken the Locksmithing course much sooner. Earned \$380 while training! Instructor was very helpful and prompt."  
**John F. Lewis, Chicago, Ill.**



"My main motivation was independence. Earned \$500 part-time while still studying. Definitely see more potential earnings."  
**Gerald Sosontovich, Pte. Claire, Que.**



"Intended to make locksmithing a hobby. Turned out to be a source of extra income. Earned \$300 part-time while training."  
**Donald J. Brooks, El Monte, Calif.**



## LOCKSMITHING INSTITUTE

Division of Technical Home Study Schools  
Dept. 110-103, Little Falls, N.J. 07424

• Approved by N.J. Commissioner of Education  
• State Approved Diploma • Approved for Veterans

**FREE BOOKLET AND  
ALL DETAILS BY MAIL**



**NO SALESMAN  
WILL CALL**

**MAIL POST-PAID  
CARD OR COUPON**

**TODAY!**

**Locksmithing Institute, Dept. 110-103**  
Div. Technical Home Study Schools  
Little Falls, N.J. 07424

**Please rush by mail your FREE booklet and all facts about the opportunities in locksmithing. I am under no obligation. No salesman will ever call.**

(print)  
Name

Address

City

State/Zip

☐ Check if eligible for Veteran Benefits



# Start your own money making business!



## Get in on the PROFITS in SMALL ENGINE service and repair

**BEAT INFLATION!** Work part time, full time right at home - we help you every step of the way.

In just a short time, you can be ready to join one of the fastest growing industries in America... an industry where qualified men are making from \$10.00 to \$15.00 per hour... and that's just for labor. Parts, engines and accessories add even more to the profits. Because the small engine

industry has grown so quickly, an acute shortage of qualified Small Engine Professionals exists throughout the country. When you see how many small engines are in use today, it's easy to understand why qualified men command such high prices—as much as \$17.50 for a simple tune-up that takes less than an hour.

### 65-million small engines are in service today!

That's right — there are over sixty-five million 2-cycle and 4-cycle small engines in service across the U.S.A. That's the official count from the Engine Service Assn., and new engines are being built at a rate of one-million per month! With fully accredited and approved Foley-Belsaw training, you can soon have the skill and knowledge to make top money servicing these engines. Homeowners and businessmen will seek you out and pay you well to service and repair their lawnmowers, tillers, edgers, power rakes, garden tractors, chain saws, mini-bikes, go-carts, snowmobiles... the list is almost endless.

You get all this Professional equipment with your course, PLUS 4 H.P. Engine... ALL YOURS TO KEEP... All at NO EXTRA COST.



**RUSH COUPON TODAY FOR THIS FACT-FILLED**

**FREE BOOKLET!**

Tells how you quickly train to be your own boss in a profitable Sparetime or Fulltime business of your own PLUS complete details on our 10-Day NO RISK Trial Offer!



Send for your copy today! No obligation



### No experience necessary.

You don't need to be a 'born mechanic' or have prior experience. If you can read, you can master this profitable trade right at home, in your sparetime, without missing a single paycheck. Lessons are fully illustrated — so clear you can't go wrong.



Learn At Home In Your Spare Time.

We guide you every step of the way, including tested and proven instructions on how to get business, what to charge, how to get free advertising, where to get supplies wholesale... all the "tricks of the trade"... all the inside facts you need to assure success right from the start.

### INCREASED INCOME

"I've had about 8 years experience repairing small engines... but repairs were only minor... until I started the Foley-Belsaw Course!"

Walter H. Strick  
Campbell, California



With our famous 'learn-by-doing' training method, you get actual 'hands-on' experience with specialized tools and equipment you'll receive with your training, plus a brand-new 4HP engine — all yours to keep.

### Send Today for FREE facts!

You risk nothing by accepting this offer to find out how Foley-Belsaw training can give you the skills you need to increase your income in a high-profit, recession-proof business of your own.

Just fill in and mail coupon below (or send postcard) to receive full information and details by return mail. **DO IT TODAY!**



**FOLEY-BELSAW INSTITUTE of SMALL ENGINE REPAIR**

50289 Field Bldg., Kansas City, MO. 64111

**No obligation... No salesman will call**

Foley-Belsaw Institute  
50289 Field Bldg. • Kansas City, Mo. 64111

☐ **YES**, please send me the FREE booklet that gives full details about starting my own business in Small Engine Repair. I understand there is no obligation and that no salesman will call.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

ZIP \_\_\_\_\_

## NEXT MONTH IN PM

PM tests the hot new...

■ Snowmobiles, outboards and Nissan Z-car.

Have a better workshop:

- Jigs to do the job.
- How to buy wood.
- Terrific layout ideas.

Escape from East Germany:

- Exciting story of the high-wire getaway.

**SUBSCRIPTION SERVICE:** Popular Mechanics Magazine will, upon receipt from its reader of a complete new or renewal subscription order, undertake fulfillment of that order so as to provide the first-copy delivery to the Postal Service within six to twelve weeks. If for some reason this cannot be done, you will be promptly notified of the issue date that will begin your subscription, with a request for any further instructions you may have concerning your order. Please address all such orders to us at Popular Mechanics, P.O. Box 10064, Des Moines, Iowa 50350. Should you have any problem with your subscription, please write Joan Harris, Customer Service Department, Popular Mechanics, P.O. Box 10064, Des Moines, Iowa 50350. To assure quickest service, please enclose your mailing label when writing to us or when renewing your subscription. Renewal orders must be received at least eight weeks prior to expiration to assure continued service.

## Popular Mechanics

P.O. Box 10060, Des Moines, Iowa 50350

**YES!** Please enter my subscription to POPULAR MECHANICS for:

- ☐ 1 year \$11.97
- ☐ 2 years \$21.97

Payment of \$\_\_\_\_\_ is enclosed.

Bill Me \_\_\_\_\_

Initial here

Name \_\_\_\_\_ (please print)

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Your first copy will be on its way to you in six to twelve weeks. Watch for it!

A publication of the Hearst Corporation.

Charge orders subject to publisher's acceptance. (Above prices apply in U.S. & Possessions only. Canadian and foreign prices upon request.)

## CHANGING ADDRESS?

If you're planning to move, please let us know at least eight weeks before changing your address. Attach current address label and fill in your name and your new address. This will serve to insure prompt service on your subscription.

Send old label with your name and new address to:

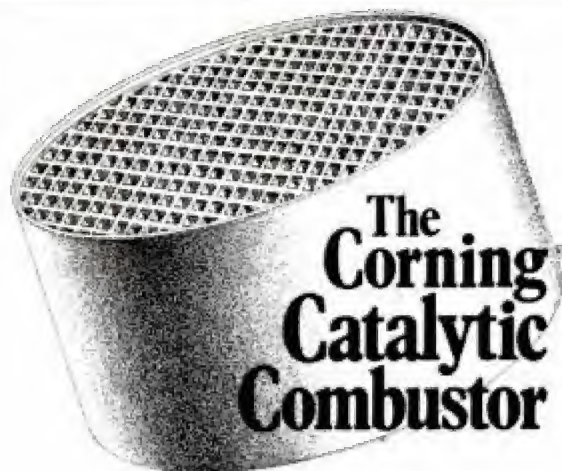
**POPULAR MECHANICS**  
P.O. Box 10064, Des Moines, Iowa 50350  
or call toll-free: 800-247-5470  
State of Iowa residents call: 800-532-1272

NAME \_\_\_\_\_ (Please print)

NEW ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP CODE \_\_\_\_\_





# SOTZ

## WOOD SMOKE AFTERBURNER

BURN SMOKE INTO HEAT

ONLY **\$79.95** Factory Pick-Up

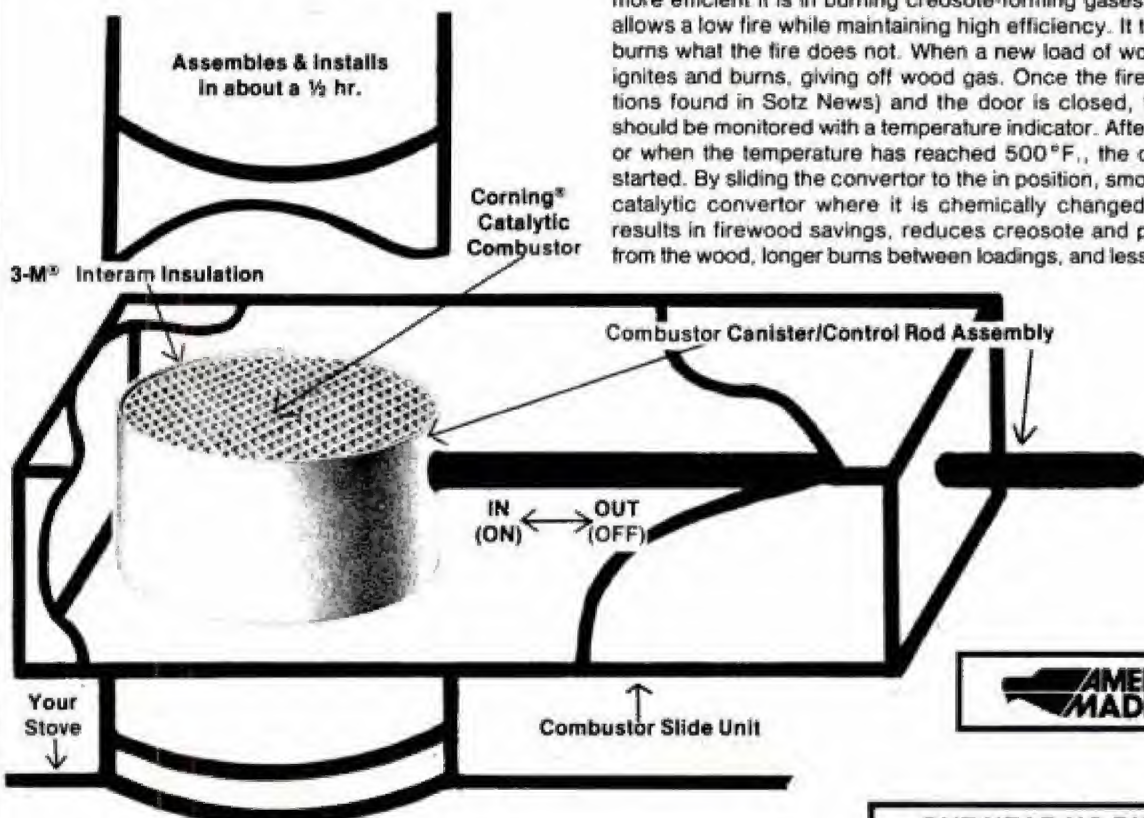
FITS ALL WOODSTOVES WITH 6" FLUE PIPE

— HOW IT WORKS —

As smoke is directed through the CATALYTIC CONVERTOR it is chemically changed so it will burn at half the temperature normally required (about 500°F.). If the catalytic convertor is provided with enough smoke, heat generated from the chemical reaction taking place within its cellular structure may increase its temperature to 1600°F. More vaporized gas is present during low fire, more fuel causes the combustor to run hotter, and the hotter the combustor runs the more efficient it is in burning creosote-forming gases. The catalytic combustor allows a low fire while maintaining high efficiency. It turns smoke into heat and burns what the fire does not. When a new load of wood is added to a stove, it ignites and burns, giving off wood gas. Once the fire has started (use instructions found in Sotz News) and the door is closed, the flue gas temperature should be monitored with a temperature indicator. After 15 minutes into the burn or when the temperature has reached 500°F., the catalytic operation can be started. By sliding the convertor to the in position, smoke is directed through the catalytic convertor where it is chemically changed into useable heat. This results in firewood savings, reduces creosote and pollution, 20% more heat from the wood, longer burns between loadings, and less chance of chimney fire.

## Cut Creosote Up to 90%

Assembles & installs  
in about a ½ hr.



### PRICE:

FACTORY PICK-UP	DELIVERED TO YOUR DOOR
<b>\$79.95</b>	<b>\$85.95</b>

(For Sotz 2-Drum Stove Owners  
Order Model #2 - Same Price)

VISA and MASTERCARD RUSH ORDERS  
Call Toll Free 1-800-321-9892  
Inside Ohio 1-216-236-5021

or SEND CHECK OR MONEY ORDER ...  
Sorry, no C.O.D.'s

**FREE** -Order now and receive 1 Tube of  
RUTLAND STOVE CEMENT - \$3.95  
Value and a TEMP. INDICATOR -  
\$4.95 Value. A total \$8.90 Value,  
**FREE**

**Corning®**  
**120 Years  
of Quality**

### ONE YEAR NO RISK GUARANTEE

IF YOU'VE BEEN THINKING CATALYTIC COMBUSTOR - BUT HEARD THAT THE HIGH-PRICED, OFF-BRANDS PERFORM POORLY AND FAIL IN A SHORT TIME, YOU CAN NOW TRY A SOTZ, USING A GENUINE CORNING® CATALYTIC COMBUSTOR AT OUR RISK!

IF, WITHIN ONE YEAR, YOU DON'T AGREE THAT IT PAYS FOR ITSELF IN:

- \* FIREWOOD SAVINGS
- \* REDUCED CHIMNEY CLEANING BILLS
- \* LONGER BURNS BETWEEN LOADINGS
- \* MORE HEAT
- \* LESS SMOKE
- \* LESS CHANCE OF CHIMNEY FIRE

YOUR MONEY WILL BE REFUNDED.

Sotz Inc., 13643 Station Rd., Columbia Station, OH 44028



# SONIC TURBO

## Rated The Best Muffler On The Market Today!

In a recent comparative testing of all turbo mufflers on the market today, **Sonic-Turbo**, from American Exhaust Industries, was rated the most efficient. Not by just a little... but by a whopping 31% over its nearest competitor! The tests, performed by Super Chevy magazine clearly showed **Sonic-Turbo** to be the most efficient muffler on the market today.

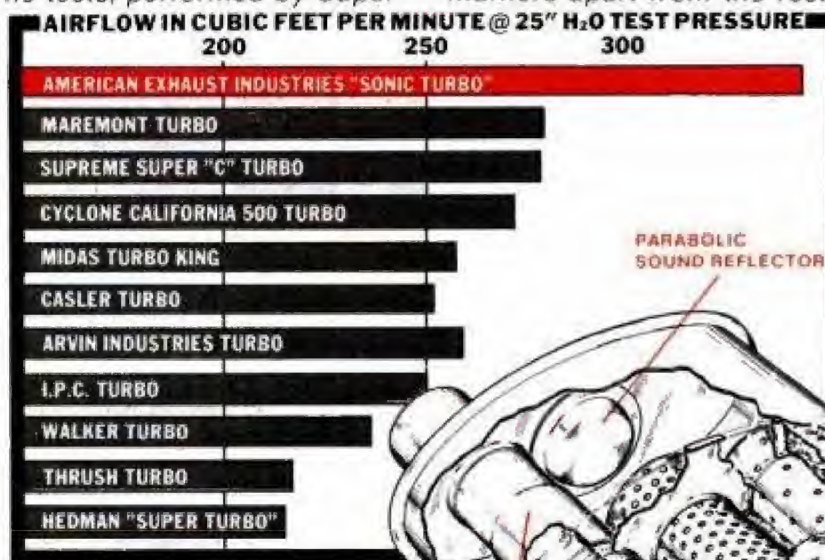
You can expect a significant increase in performance and fuel economy by merely replacing your stock (or other aftermarket) mufflers with high efficiency **Sonic-Turbos**. Through eliminating power-robbing exhaust backpressure your engine will breathe easier. It's as simple as that.

You should also know that this extra performance is not gained at the expense of increased noise. Quite the contrary. Because of **Sonic-Turbo's** exclusive "Parabolic Sound Reflectors" offensive sound waves are cancelled out. All that remains is a deep, powerful

sound that won't peg dB meters... and doesn't have the "whoosh" of a stocker! Only **Sonic-Turbo** mufflers have the unique Parabolic Sound Reflectors (pat. pend.).

There are many other features that set **Sonic-Turbo** mufflers apart from the rest of the pack, including

precision formed pass tubes, cores with varying perforation densities, Pyrex 1200° thermal packing and a double wrapped galvanized steel case. Clearly, **Sonic-Turbo** can out-perform and out-last any muffler of its type on the market today.



- ☐ I'm interested in learning more about Sonic-Turbo mufflers. Please send me a **FREE** 6-page reprint of the Super Chevy Turbo Muffler article and complete pricing information.
- ☐ I've added \$2 so you can send me a copy of the latest Cyclone or BlackJack (circle one) catalog and appropriate Gen. Trade pricing.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_

Type car \_\_\_\_\_

Year \_\_\_\_\_

send to: AMERICAN EXHAUST INDUSTRIES  
18933 South Reyes Avenue, Dept. 1083P  
Compton, CA 90221

Products may be ordered direct from American Industries at prevailing Gen. Trade prices plus \$15 shipping and handling. CA residents add 6.5% tax.

Manufactured by American Industries Exclusively For:








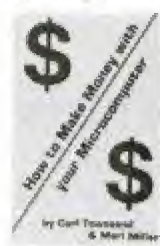






















# HOW-TO BOOK CLUB

More projects, more practical useful information, and more ways to save!

Shows you hundreds of ways to do-it-yourself, do-it-right, and save money, too!

Select 6 Books for \$2<sup>95</sup>

Save up to \$123<sup>70</sup>

 1510 List \$17.95	 335 List \$14.95	 1172 List \$8.95 (paper)	 1530 List \$21.95	 1520 List \$18.95	 1546 List \$18.95	 1568 List \$16.95	 1365 List \$16.95
 1281 List \$12.95	 1460 List \$18.95	 1244 List \$19.95	 1508 List \$19.95	 1458 List \$17.95	 1461 List \$15.95	 1468 List \$17.95	 1392 List \$19.95
 1297 List \$16.95	 1226 List \$7.95 (paper)	 2294 List \$8.95	 1160 List \$13.95	 1415 List \$19.95	 1430 List \$18.95	 1484 List \$21.95	 1409 List \$15.95

## 7 very good reasons to try How-To Book Club

Blue Ridge Summit, PA 17214

- **Exceptional Quality.** All books are first-rate publisher's editions, filled with useful, up-to-the-minute information
- **Reduced Member Prices.** Save 20% to 75% on books sure to increase your know-how
- **Satisfaction Guaranteed.** All books returnable within 10 days without obligation
- **Club News Bulletins.** All about current selections—mains, alternates, extras—plus bonus offers. Comes 13 times a year with dozens of up-to-the-minute titles you can pick from
- **"Automatic Order."** Do nothing, and the Main selection will be shipped automatically! But... if you want an Alternate selection—or no books at all—we'll follow the instructions you give on the reply form provided with every News Bulletin
- **Continuing Benefits.** Get a Dividend Certificate with every book purchased after fulfilling membership obligation, and qualify for discounts on many other volumes
- **Bonus Specials.** Take advantage of sales, special events, and added-value promotions



## HOW-TO BOOK CLUB

Blue Ridge Summit, PA 17214

Please accept my membership in How-To Book Club and send the 6 volumes circled below, billing me \$2.95 plus shipping and handling charges. If not satisfied, I may return the books within ten days without obligation and have my membership cancelled. I agree to purchase 4 or more books at reduced Club prices (plus shipping/handling) during the next 12 months, and may resign any time thereafter.

335 1128 1160 1172 1226 1244 1281  
1287 1297 1321 1365 1392 1409 1412 1415  
1424 1430 1458 1460 1461 1469 1484  
1508 1510 1512 1520 1530 1546 1568 2294

Name \_\_\_\_\_ Phone \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Valid for new members only. (Orders outside U.S. or Canada must be prepaid in International Money Orders in U.S. dollars. Canada must remit in U.S. dollars.) This order subject to acceptance by How-To Book Club. PM-1083



# Here's all the money you need to put down on a new Miles home:

## \$0<sup>00</sup>

### NO DOWN PAYMENT

No money down, below market financing, low monthly payments. It's not too good to be true—just too good to be passed up. We provide step-by-step instructions and pre-cut materials. Join 20,000 happy homeowners who have gotten into the housing market the Miles do-it-yourself way.

Please send me (check one or both):

☐ Free color brochure

☐ Miles catalog (Please enclose a \$3.00 check or money order.)



The Charleston

Mail to: Miles Homes, 4700 Nathan Lane, P.O. Box 9495, Minneapolis, MN 55440

PHONE NUMBER ( )

NAME

ADDRESS

CITY COUNTY

STATE ZIP



You're Miles ahead  
with no down payment



MPM1-1083

## MAKE CLOCKS

### Q-SERIES MINI-QUARTZ

MADE IN U.S.A.

#### TWO YEAR GUARANTEE

Q-72 for Dials  
up to 3/8" thick

Q-73 for Dials  
up to 3/4" thick

1-4 \$6.60 ea.

5-9 \$5.95 ea.

10-24 \$4.85 ea.

25-49 \$4.45 ea.

50-99 \$4.25 ea.



#### FREE HANDS with EACH MOVEMENT

Second Hand 20¢ ea. (Black, Brass or Red)

Include \$2.00 Minimum  
U.P.S. Delivery Charge

Largest Selection of Quartz and  
Mechanical Movements, Dials, Hands, etc.



CALL TODAY!  
(414) 248-1150



**KLOCKIT** DEPT. PM103  
P.O. BOX 629  
LAKE GENEVA, WI 53147

You may include \$1 for first class mailing

## FREE CATALOG

### GARAGE DOOR OPENERS

- Radio Controlled
- Buy Factory Direct and Save
- Thousands In Use
- Free Brochure
- Easy Homeowner Installation
- Immediate Shipment by UPS or PP

HELMATE Equipment Co., Dept. PM103 Baroda, MI 49101

### FREE SAMPLE IMPORT MEN WOMEN START MAIL ORDER HOME IMPORT BUSINESS

I'll send you a free sample import to prove you can make big money in your own spare/full time business. No investment in stock. World's most famous importer will guide you. Clip this ad, good for free sample and big Free Report — tells all! Offer limited to adults. Mail this ad today. **THE MELLINGER CO.,** 6100 Varier Ave., Dept. E225A, Woodland Hills, CA 91364.

### SWISS ARMY TYPE KNIFE



Westbury Sales P.O. Box 434, 373 Maple Ave.  
Westbury, N.Y. 11590 Dept. E-10-PM

## Waterproof FLIGHT JACKET

Rugged, all weather, waterproof nylon satin outer fabric, fully lined with warm Sherpa pile. Available in navy in a wide selection of sizes S (34-36), M (36-40), L (42-44), XL (46-48), XXL (50-52), XXXL (54-56).

**\$35.99**

Our Price

**\$27.99**

XXL \$29.99

XXXL \$32.99



☐ Please send Free 72 page color catalog of rugged work and outdoor clothing.

Send \_\_\_\_\_ Jackets. Size \_\_\_\_\_  
(Please add \$3 shipping & handling.)

Enclosed is a check or money order for \$ \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Mail To:

WEAR-GUARD WORK CLOTHES  
Norwell, MA 02061

MC, VISA, AMEX CALL TOLL-FREE for fast service

**800-343-4406**

## CUSTOM

WE CUSTOM-MAKE GLASS SCREENS  
TO FIT ANY ARCHED, ODD-SIZE  
OR STANDARD DIMENSION  
FIREPLACE OPENING.

© The Iron Shop 1979, '82



We build our custom glass fireplace screens without compromise in materials or workmanship. The frames are crafted from heavy gauge steel. Hinges, latches and mesh curtains are all extra heavy duty. We'll not only build you a glass screen to fit, it could last as long as your fireplace.

Now on display at our new locations:

Pomona, CA Sarasota, FL Houston, TX  
(714) 598-5766 (813) 923-1479 (713) 789-0648

CALL OR WRITE FOR FREE BROCHURE:

To: The Iron Shop, Dept. ISC Box 178, 400 Reed Road,  
Broomfield, CO 80020

Or: Tel. (215) 544-7100

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

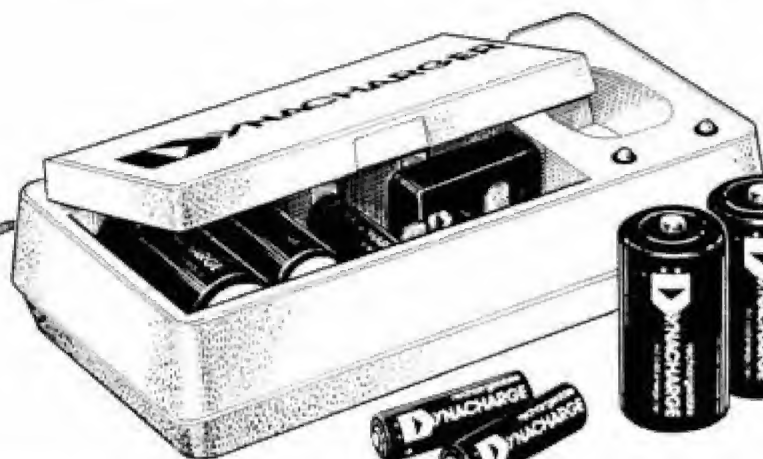
We accept Master Card and VISA

**THE IRON SHOP®**  
MANUFACTURERS



**Stop throwing your money away on short-life batteries...take advantage of this special offer!**

# Introducing the First "Smart" Battery Charger



Every personal stereo, electronic game, camera flash attachment and toy you own can drain away your money to the tune of hundreds of dollars a year.

Now you can stop supporting the battery industry and start saving your money for more important things. The brand-new Dynacharge battery charger and rechargeable batteries give you 1,000 times your normal battery output for just pennies per use.

## Tests Prove Dynacharge Can Save You Hundreds of Dollars

Every year, according to an independent laboratory test, you spend up to \$100 for every 100 hours you use your Walkman, or other personal stereo. Dynacharge 5-Year Rechargeable Batteries, in the same cassette player, can cost as little as 80¢.

Imagine your cost savings over a year, when you consider how many battery-operated products you use: camera flashes and autowinders, radios, flashlights, portable TVs, electronic "computer" toys and more.

## Five Year or 1,000 Charge Guarantee

Year after year after year you'll continue to realize big savings...because each Dynacharge battery you buy can be recharged at least 1,000 times. And your guarantee is good for that...or five years, whichever comes first. And, Dynacharge

Rechargeable Batteries come in all popular sizes, "AA" "C" "D" and 9 volt.

## Why Do We Call It the "Smart" Charger?

Overnight, the Dynacharge unit can charge up to four different size batteries at the same time. And, it charges only when the batteries need charging, so you can keep your batteries in the charger without fear of overcharging...and without wasting costly electricity.

## Special Offer, Save \$10

Now, for a limited time, you can start saving money immediately, because we're offering the Dynacharge Charger at \$10.00 off its usual price of \$19.95.

**For \$9<sup>95</sup>  
only**

plus the cost of Dynacharge batteries in the size of your choice, you'll never throw money away again on ordinary batteries.

## No Risk Guarantee

If you are not completely satisfied with your purchase, return the merchandise in its original package and we will cheerfully refund your money in full.

We back our products! We give our own guarantee, as well as the manufacturer's for one full year after your purchase.



## Order Now Call Toll Free

Don't wait another moment. Even now your alkaline batteries are losing power and draining your budget. Use VISA, MasterCard, Diner's Club, Amer. Express or Carte Blanche. Call anytime, 24 hours a day.

**1-800-257-6173**

In NJ: 1-800-232-6677

Most orders shipped within 48 hours

Battery Charger, G33,077 . . . \$9.95

Rechargeable NiCad Batteries

"AA" Cell (pkg. of 2) G33,073 \$7.95

"C" Cell (pkg. of 2) G33,074 9.95

"D" Cell (pkg. of 2) G33,075 10.95

9 Volt (pkg. of 1) G33,076 11.95

Add \$2.50 for postage and handling.

## SEND FOR FREE FULL-COLOR CATALOG

America's largest mail-order marketplace of thousands of fascinating values in watches, health, weather, electronics and solar energy for hobbyists, gadgeteers, students, schools and industry.

To order by mail: We accept major credit cards; include account number and expiration date, or if you prefer, mail check or money order. Include item number and postage/handling charge. NJ residents add 6% sales tax. Most orders shipped within 24-48 hours.



**Edmund Scientific Co.**  
101 East Gloucester Pike, Dept. R223, Barrington, NJ 08007



## Be Your Own Boss ...IN YOUR OWN BUSINESS!

Hundreds we've trained have succeeded in this fascinating and highly profitable profession ...  
...**YOU Can Do It, Too!**



"No more hard, nasty work for me. Now I have my own business and with hardly any effort I average around \$50 a day. Thanks for my new start in life."

Sam Walker Prichard, Alabama



"I opened my own business, spare time, seven months after I enrolled and made a profit of \$329 for the first week."

B. A. Deberry Littleton, Colorado

"Before enrolling I checked other courses and also asked for advice from several of the professional locksmiths in my area. They all said Foley-Belsaw was top and had the most versatile Key Machine."

"I always wanted to have my own business and now I do, thanks to Foley-Belsaw."

David Fairbrother—Dave's Locksmith Service  
Milwaukee, Wisconsin 53209



Work Part Time, Full Time — Right at Home.

# Be a LOCKSMITH!

**Get into this booming high-profit business that's  
Easy to learn—Easy to do—Easy on You!**

Never before have money-making opportunities been so great for qualified Locksmiths. Now lucrative regular lock and key business has multiplied a thousandfold as millions seek more protection against zooming crime. Yet there's only one Locksmith for every 17,000 people!

**Make Up to \$12.50 an Hour—even while learning!**

**Train FAST at Home!**

You're "in business" ready to earn \$5 to \$12.50 an hour a few days after you begin Foley-Belsaw's shortcut training. Take advantage of today's unprecedented opportunities in locksmithing for year-round EXTRA INCOME in spare time — or fulltime in a high-profit business of your own. Hundreds we've trained have done it. So can YOU! All tools plus professional Key Machine given you with course. These plus practice materials and equipment, plus simple, illustrated lessons, plus expert supervision, plus business-building guidance will enable you to KEEP THE MONEY COMING IN! Ideal for retirement — good jobs, too.

**SEND FOR EXCITING FACTS—No Obligation**

Discover what's in Locksmithing for you — how Foley-Belsaw's master-locksmith-approved training can give you the skill you can depend on to EARN MORE — ENJOY LIFE MORE.

**No Extra Cost!**

**Included With Your Locksmith Training**



**BURGLAR ALARM and SECURITY SYSTEMS**

training Covers all phases of Burglar, Hold-Up and Fire Alarm servicing and installation. This valuable and timely instruction

includes all special tools and supplies. ONLY Foley-Belsaw offers such extensive training in this rapidly expanding field as a part of your Locksmith training.

**ADVANCED Locksmithing!**

How to change combinations, install and service Safe, Vault and Bank Safe-Deposit Box locks. You learn-by-doing on the locks that we supply. You'll find it fascinating and highly profitable work.

**ALL SPECIAL TOOLS AND EQUIPMENT INCLUDED!**



**FOLEY-BELSAW INSTITUTE**

10293 Field Bldg., Kansas City, Mo. 64111

**PRO KEY MACHINE YOURS TO KEEP!**



This Pro Key Machine can alone add up to \$200 a month to your income ... and it won't cost you a penny extra with your training.

**YOURS FREE**

**10-DAY NO RISK TRIAL!**

**SEND FOR FACTS TODAY!**

**RUSH COUPON**

**Find out all about it!**

Just fill in and mail coupon below (or send postcard) to receive full information and details by return mail. **DO IT TODAY!**

**There is NO OBLIGATION and NO SALESMAN Will Call—ever!**

**RUSH COUPON TODAY FOR THIS FACT-FILLED**

**FREE BOOKLET!**

Tells how you quickly train to be your own boss in a profitable Sparetime or Fulltime business of your own PLUS complete details on our 10-Day NO RISK Trial Offer!



Send for your copy today!

FOLEY-BELSAW INSTITUTE, 10293 FIELD BUILDING  
KANSAS CITY, MISSOURI 64111



☐ YES, please send me the FREE booklet that gives full details about starting my own business in Locksmithing. I understand there is no obligation and that no salesman will call

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

# FREE COLOR CATALOG

**Build Your Own Grandfather Clock  
Prices Starting Under**

**\$265**

(including movement and dial)

- Do-it-yourself case kits, parts pre-cut
- Finished clocks
- Solid 3/4" hardwoods: black walnut, cherry, oak
- Hierloom quality
- Factory direct prices
- Solid brass West German chiming movements
- Money back guarantee
- Prompt shipment

MASTERCARD and VISA ACCEPTED  
Call or Write:



**EMPEROR CLOCK COMPANY**  
WORLD'S LARGEST MANUFACTURER OF GRANDFATHER CLOCKS

Dept. 919, Emperor Industrial Park  
Fairhope, Alabama 36532  
Phone 1 205 928-2316

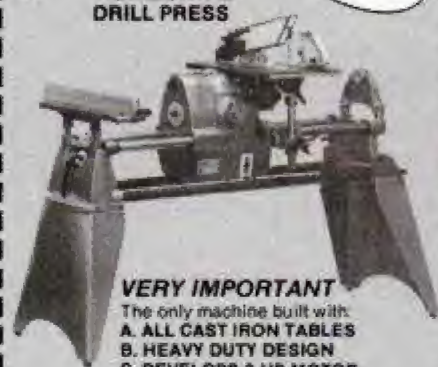
IN CANADA: Emperor Clock Company, Inc., Dept. 919  
506 Newbold Street, London, Ontario N8E 1K6

## WOODWORKING MACHINES 5 in 1 Combination

WITH ELECTRIC MOTOR WHICH DEVELOPS 3 HP.

- 34" LATHE
- 10" TABLE SAW
- 11 1/2" DISC SANDER
- 16 1/2" VERTICAL DRILL PRESS
- HORIZONTAL DRILL PRESS

REGULAR PRICE \$1,200  
now only \$999.



**VERY IMPORTANT**

The only machine built with:  
A. ALL CAST IRON TABLES  
B. HEAVY DUTY DESIGN  
C. DEVELOPS 3 HP MOTOR  
D. BUILT AS AN INDUSTRIAL MACHINE

ONE PLACE FOR ALL YOUR NEEDS...

**CALL NOW!!! FOR FREE GIFT**  
Toll Free (1-800) 421-2467

IN CALIFORNIA CALL COLLECT (213) 549-0761

☐ VISA ☐ MASTERCARD ☐ MONEY ORDER

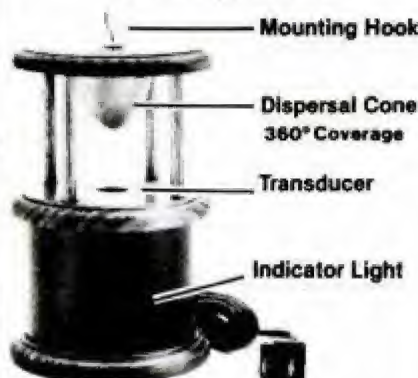
PLANT:

**MASTER WOODCRAFT CO.**  
800 SPRUCE LAKE DRIVE • P.O. BOX 669  
HARBOR CITY, CA 90710  
(A Republic-Lagun Group)

Dealership Available



## "NEW" ULTRAS II ULTRASONIC POWER GUARANTEES



**NO** RATS, BATS,  
MICE, ROACHES,  
MOSQUITOS,  
FLEAS AND OTHER FLYING OR  
CRAWLING PESTS.

ULTRAS II, THE MOST POWERFUL AND ... THE ONLY SYSTEM AVAILABLE TO THE PUBLIC, DESIGNED AND MANUFACTURED BY PEST CONTROL SCIENTISTS AND PROFESSIONAL EXTERMINATORS.

Gets rid of rodents and many insects indoors and out ... Scientifically eliminates pests without poisons, chemicals, traps and sprays ... Ultrasonic force field drives them away permanently. Advanced circuitry generates ultrasonic sound waves on frequencies at which pests communicate. These nerve crushing sounds, to rodents and insects, penetrate their brain and nervous system causing pain and discomfort, but are inaudible to humans and domestic animals, and are completely safe.

**REMARKABLE BREAKTHROUGH IN ULTRASONIC TECHNOLOGY COMBINES UNPRECEDENTED POWER AND OMNIDIRECTIONAL TRANSMISSION.**

This new machine does not have the limitations of other pest repellers: A powerful ultrasonic transducer (not a speaker) sends out signals in all directions (360°). You don't have to "aim" it.

**COVERS UP TO 20,000 CU. FT. (2500 SQ. FT.)**

Attacks tough pest problems everywhere: home, apartment, vacation home, or farm.

**Scientific Health Services' Exterminators** use it in schools, hospitals, nursing homes, and restaurants for indoor-outdoor protection. Our **Pest Control Division** has found in test after test that **Ultras II** is the first really new development in ultrasonic pest repellers.

### SPECIFICATIONS AND FEATURES:

Cabinet—mahogany finish, 7"H x 4 1/2" dia. Weight: 2 lbs. • Uses less than 2 watts, plugs into any 110V AC outlet (220V available) • Sound pressure: 128 dB at 42,000 Hz. • American made to the toughest commercial standards. (PATENT PENDING)

#### OUR PERSONAL GUARANTEE

TRY IT FOR 30 DAYS, IF NOT PLEASED, RETURN FOR FULL REFUND, ALSO COVERED BY A ONE-YEAR MANUFACTURER'S WARRANTY.

#### TO ORDER

Send \$69.95 plus \$3.00 for shipping and handling by check, money order or MasterCard/Visa number and expiration date to:  
SCIENTIFIC HEALTH SERVICES, Dept. PM  
1266 Soldiers Field Rd., Boston, MA 02135  
OR CALL TOLL FREE 1-800-334-0854 EX. 883  
N.C. Residents call 617-783-3187

**SHS** SCIENTIFIC HEALTH SERVICES  
Pest Control Division

1266 SOLDIERS FIELD ROAD BOSTON, MA 02135

# AMERICAN EAGLE DIAMOND BELT BUCKLE

Only  
**\$19.95**



**Electroplated  
with  
SILVER**

**Hand Decorated  
with  
24K GOLD**

**Set with  
a genuine  
DIAMOND**

**An individually numbered, Registered Limited Edition**

Every American is proud of our nation, and proud of the great American Eagle, symbol of our country's vigilance and strength. Now, master craftsmen have created an exclusive Eagle Belt Buckle every patriotic American will wear with honor and pride.

**Buckle Will Not Be Produced  
After Dec. 31, 1983**

Each buckle will be individually crafted in an exclusive limited edition — *electroplated with silver, with 24-karat gold applied to the surface of the eagle and rim. In addition, each buckle will be set with a hand-cut and polished .25 pt. genuine diamond with 17 fiery facets!* And, to protect the integrity of this limited edition, the dies will be destroyed at the end of this year.

**Registered in Official Archives**

Each buckle will be individually numbered and the name of each original owner will be permanently registered in the Official Archives of International Mint. Each buckle will be delivered to you with a Certificate of Authenticity

in a special Collector's Presentation Case.

Wear this authentic collector's buckle as a striking fashion accessory and unmistakable symbol of your love for your country. Then, hand it on to become a treasured heirloom as well. Your satisfaction is assured by our unlimited money back guarantee.

**Order Early For Coveted  
Lower Serial Numbers**

Since registry numbers are assigned to each order as it is received, we strongly urge that you order promptly to receive the lower numbers that are still available. Limit five (5) buckles per request.



**FREE!** if you  
order within 11 days!

American Eagle Silver Ingot. Contains five grams of .999 fine silver and is hand-decorated with genuine 24-karat gold. Beautiful and fashionable — complete with 18" sterling silver chain!

Regular Retail Value \$12.95

Actual Size

**For Credit Card Orders, Call Toll Free: 1-800-345-8500.**

International Mint, Dept. GDF-42  
390 Pike Road,  
Huntingdon Valley, Pa. 19006

Please send me the Genuine Diamond American Eagle Belt Buckle(s) indicated below on your money-back guarantee of satisfaction (except shipping and handling of course).

- ☐ One buckle just \$19.95 plus \$1.75 p&h
- ☐ **SAVE \$6.40!** Two buckles just \$35 plus \$2.00 p&h
- ☐ **SAVE \$15.10!** Three buckles just \$50.00 postpaid
- ☐ **SAVE \$33.50!** Limit of five buckles just \$75.00 postpaid
- ☐ I AM ORDERING WITHIN 11 DAYS, SEND ME ONE (1) FREE AMERICAN EAGLE SILVER INGOT WITH EACH BUCKLE ORDERED (LIMIT 5)

☐ Enclosed is my check or money order in the full amount for \$ \_\_\_\_\_  
(Pa. res. add 6% sales tax)

☐ CHARGE IT: ☐ VISA ☐ MasterCard  
☐ Amex ☐ Diners Club Expires \_\_\_\_\_

Card # \_\_\_\_\_

Signature \_\_\_\_\_

Print Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

© 1983 International Mint, not affiliated with the U.S. Mint



**IMPORTED LOCK BLADE**

8" Overall Length **\$3.50 Ea.**

5" When Closed

- Not a Switch Blade
- Sharp and Tough
- Stainless Steel Blade

Model # K-12-AL

Flips open instantly and locks automatically to prevent accidental closing. Razor sharp tough stainless steel blade for reliable use and hard long service. Send \$3.50 plus 50¢ to cover postage and handling.

**WESTBURY SALES CO.**  
373 MAPLE AVE. Dept. L-10-PM WESTBURY, N.Y. 11590

**PTERODACTYL LTD.**  
P.O. BOX 191-PM  
WATSONVILLE, CA 95776

FOR COMPLETE INFO ON OUR AIRCRAFT SEND \$5 TO:

**MAKE TOYS** Plans, Kits Hardwood Wheels, Parts Catalog \$1.00

Cherry Tree Toys, Belmont, OH 43718 (614) 484-1746

**HYDRAULIC JACK REPAIRS**

A Business of your own.

Earn while you learn at home. Millions of jacks in gas stations, trucking firms, etc. need servicing. We show you HOW. Start spare time in your basement or garage. Big opportunity for mechanics.

Write for folder No. PM10 and free bonus offer.

**HYDRAULIC JACK INC.**  
P.O. BOX 18, ACCORD, NY 12404

Our 11th year

**cut FUEL bills**

Modernize your fireplace with **HEARTH AID II**

America's favorite fireplace heat exchanger

**Increases Heat Output by 500%**

- \*Custom Fit to any Fireplace.
- \*Easy to install. No tools required.
- \*Thermostatically controlled, works automatically.
- \*Super Efficient titanium stainless Heat Exchanger.
- \*Best Value
- \*No extras to buy
- \*No dangerous Creosote Buildup

And best of all you can enjoy your fireplace while saving on your heating bills because with Hearth-Aid II \* you don't need to sacrifice your fireplace's appearance or the delight of an open fire to be energy efficient.

For Free Information, Write or Call:  
**Thermalite Dept. PM, P.O. Box 658**  
Brentwood, Tn. 37027  
Nationwide Toll Free: 1-800-431-1953  
N.Y. Only: 1-800-942-1935

**MOLDS**

for making Ornamental Concrete Items

Book about Aluminum Molds with prices and production trade secrets direct from world's largest mold manufacturer.

**SEND \$5.00**

**CONCRETE MACHINERY COMPANY, INC.**  
P. O. BOX A99 - HICKORY, N. C. 28601

**Telephone Listening Device**

Record telephone conversations in your office or home. Connects between any cassette or tape recorder and your telephone or telephone LINE. Starts automatically when phone is answered. Records both sides of phone conversation. Stops recorder when phone is hung up. This device is not an answering service.

**Each \$19.95**  
Qty. Disc Avail.

**Super Powerful Wireless Mic**

10 times more powerful than other mics. Transmits up to 1/2 mile to any FM radio. Easy to assemble kit. 15V battery (not incl.)

Call (305) 725-1000 or send \$19.95 + \$1.00 shipping per item to USI Corp., P.O. Box PM-2052, Melbourne, FL 32901. COD's accept. For catalog of transmitters, voice scramblers and other specialty items, enclose \$2.00 to USI Corp.

**BANDSAW MILL**

The WOOD-MIZER is a one man portable sawmill with a huge 30" dia x 10' long cutting capacity. This safe, wide-to-open mill cuts with an efficient traveling bandblade carriage. Why waste lumber and money by cutting with an old fashioned circular mill when the WOOD-MIZER can give you 30% more usable lumber out of each log at less than half the fuel and labor cost? This accurate cutting system is everything a sawmill should be and more.

For More Information Send \$1.00 to:  
**WOOD-MIZER, Dept. CO**  
4006 W. 10th St.  
Indianapolis, IN 46222  
(317) 243-7883

**BEAT the HIGH COST of LIVING!**

**HERE IS A BEAUTIFUL WAY TO MAKE MONEY!**

**UPHOLSTERY BOOKLET MAILED FREE!**

**LEARN UPHOLSTERY AT HOME**... restore old chairs, sofas to like-new condition! A clean, enjoyable way to put spare hours to profitable use. Old cast-offs picked up for dollars, worth hundreds when reupholstered! Fascinating home study course includes tools, kits, supplies. Earn as you learn—start your own business! **SEND FOR OUR FREE BOOK TODAY! GET A BIG ILLUSTRATED 24 PAGE BOOK ON UPHOLSTERY** and the upholstery business and a sample lesson showing how the fabulously successful MUI system is taught. It costs you nothing to get the information and there's no obligation. No salesman will call.

**SEND FOR OUR FREE BOOK TODAY!**

Modern Upholstery Institute,  
80184 Field Building, Kansas City, Missouri 64111

**MODERN UPHOLSTERY INSTITUTE**  
80184 Field Building, Kansas City, Mo. 64111

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

A FAMILY TRADITION SINCE 1916

**KUEMPEL CHIME**

Our Experience... Your Craftsmanship

**Build the Finest**

- \* Save 50% on easy to assemble Red-i-Kut Grandfather Clock Kits
- \* 3/4" cherry, oak or walnut
- \* 1" beveled glass included
- \* Handcrafted by grandfathers
- \* Tubular bell movements
- \* Or start from scratch 3 plans for \$5.00

Write for Free Literature or Call  
**1-800-328-6445**  
Between 8 a.m. & 4 p.m.

**KUEMPEL CHIME Clockworks**  
Dept. 512, 21195 Minnetonka Blvd.  
Excelsior, MN 55331

**UNCLOGGING DRAINS IS AS EASY AS TURNING ON YOUR FAUCET**

**drain king**

**FOR 1" TO 6" DRAINS**

Connect Drain King to a garden hose, insert it into drain opening of any clogged sink, tub, shower, etc., and turn hose water on. Patented device expands and locks Drain King in place and sends powerful jets of water thru drain to quickly clear out blockage. ONE YEAR GUARANTEE.

AVAILABLE IN BETTER HARDWARE STORES OR SEND FOR FREE BROCHURE TO Q.T. **WATER PRODUCTS, INC.**, 19438 BUSINESS CENTER DR., NORTHIDGE, CA 91324. PM-10

**Restore Old Picture Frames for HOBBY, FUN, PROFIT!**

**New 24 Page Booklet Tells You How Save or Make Big Dollars**

Easily, Inexpensively, Authentically Fully Illustrated, easy-to-read! Money back guarantee. Send \$2.95 (plus 80¢ shipping and handling) to Dept. H201, 54 Pugh Road  
**JPS BARKTON CO., INC.**, Stratford, PA 19087

**BASEMENT TOILET**

FLUSHES UP To Sewer or Septic Tank

No Digging Up Floors—Installs Easy, Anywhere!

Write McPherson, Inc., Dept. 16  
Box 15133 Tampa, Florida 33684

**GARDENING? NEW TIGER TILLER**

**TILLS KNEE DEEP! ... WEEDS SHALLOW RUNS SINGLE HANDED ... MAKES SOIL WEED FREE FAST ... WITHOUT HARD WORK.**

Weights 22 Pounds Tills Deeper Than Gasoline Powered Other Tillers Do Weeds Fast from 12 to 2 in. Wide

**NOT SOLD IN STORES ... FREE GARDENING GUIDE**

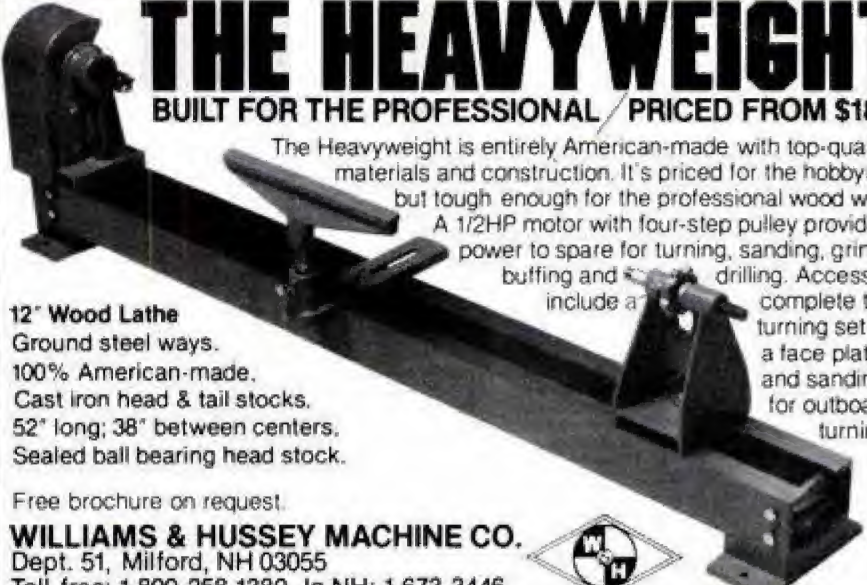
WRITE TO ALLENTOWN TILLER CO. DEPT. P  
c/o Allentown Feed Co., Main St., Allentown, N.J. 08501

For Rush Mailing of Literature call Ask for Betty Allen **201-530-9380**



# THE HEAVYWEIGHT

**BUILT FOR THE PROFESSIONAL / PRICED FROM \$189**




The Heavyweight is entirely American-made with top-quality materials and construction. It's priced for the hobbyist, but tough enough for the professional wood worker. A 1/2HP motor with four-step pulley provides power to spare for turning, sanding, grinding, buffing and drilling. Accessories include a complete tool turning set and a face plate and sanding disk for outboard turning.

**12" Wood Lathe**  
Ground steel ways.  
100% American-made.  
Cast iron head & tail stocks.  
52" long; 38" between centers.  
Sealed ball bearing head stock.

Free brochure on request.

**WILLIAMS & HUSSEY MACHINE CO.**  
Dept. 51, Milford, NH 03055  
Toll-free: 1-800-258-1380 In NH: 1-673-3446



## Find twice the treasure . . .

with a **WHITE'S ELECTRONIC MINERAL/METAL DETECTOR**



White's instruments detect rings, jewelry, coins, plus other valuables and it's profitable! Metal detecting is a hobby for the whole family to enjoy. Models from \$79.95. Covered by U.S. Patents.

**In half the time**

FOR THE NEAREST WHITE'S DEALER AND A FREE CATALOG CALL TOLL FREE  
**1-800/547-6911**

**WHITE'S ELECTRONICS, INC.** 1011 Pleasant Valley Rd., Sweet Home, OR 97386

PA-3

## POWER TOOL OWNERS

### NEW SELECT III SPEED CHANGER



**FEATURES**

- SLOW RPM BY 3 TIMES
- SPEED UP RPM BY 3 TIMES
- RETURN SPEED TO ORIGINAL RPM
- RPM CHANGES CAN BE MADE IN SECONDS
- 90 DAY WARRANTY

**APPLICATION**

- DRILL PRESSES
- LATHES
- SHOPSMITH NO. 10 SR
- MOST OTHER TOOLS (NEMA 3B FRAME MOUNT)

**\$169.95**  
(MOTOR NOT INCLUDED)

POSTAGE & HANDLING ADD \$7.00  
Send Check or Money Order. Calif. Res. add 6% tax.

For additional information call or write: **(213) 694-0636**  
P.O. Box 3380  
**HANSON TOOL CO.** La Habra, CA 90831

**WIDE SELECTION OF MOTORS AVAILABLE**

## SUPER BARGAIN SPECIALS!

**ENERGY SAVERS BRAND NEW**



**VARIABLE SPEED Tangential AC Blowers**

- Many ventilating, exhausting uses. Use with solar collectors, wood stoves, fireplaces, cool electronic gear. Speed control furnished.

**ITEM 16-944** -- 50-CFM, 115-VAC, 1/2-amp. 2-3/8" diam. x 4-1/2" wheel, 7-1/2" x 3-1/2" x 3-1/2", 4 lbs. **\$16.50**  
*Prepaid-Continental U.S.*

**ITEM 16-945** -- 200-CFM, 115-VAC, 1.7-amps. 2-3/8" diam. x 12" wheel, 16-1/2" x 3-1/2" x 3-1/2", 5-1/2 lbs. **\$22.50**  
*Prepaid-Continental U.S.*

Send \$1.00 For 124-Page Equipment Catalog  
Ph. (402) 474-4366

**SURPLUS CENTER**  
Dept. PM-103 Lincoln, NE 68501



## Spiral Stairs.

Before you invest hundreds of dollars send for our Handbook.



**DUVINAGE**

**FREE!**

spiral stairs circular stairs

**Now Also Available in Kits**  
Learn everything you need to know about the finest spiral and circular stairs (shown in beautiful room settings). Mail coupon today for our free, full-color catalog.  
Duvinage Corp Box 828, Hagerstown, MD 21740

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_  
Zip \_\_\_\_\_ Phone (\_\_\_\_) \_\_\_\_\_  
Area Code \_\_\_\_\_ PM1083

# ADJUST YOUR HEADLIGHTS

quickly, easily with this unique new tool.



So easy to use yet so important to your safety and the safety of others. The Hoppy Headlight Aim Adjuster checks vertical beam alignment (the cause for nearly 80% of misaimed headlights). Proper adjustment can be made with a screwdriver. The whole job takes just a few minutes. Use for periodic check-ups, when headlamps are replaced. **Particularly useful when pulling boat, trailer, camper.** Fits large or small lamps. Specify round or rectangular configuration. Made by the world's largest headlamp aimer manufacturer. If not available at your local automotive store or department, order direct. Only \$12.95 each plus \$3.00 postage and handling. Allow four weeks for delivery. Satisfaction guaranteed. If not satisfied, return postpaid within 30 days for full refund.

**Hopkins Manufacturing Corporation**   
Dept. PM103 Box 2222 • Emporia, KS 66801

Hopkins Manufacturing Corp. Dept. PM103  
Box 2222 • Emporia, KS 66801

Send \_\_\_\_ Headlight Aim Adjusters @ \$12.95 each plus \$3.00 postage and handling. My vehicle(s) headlights are:

☐ Round ☐ Rectangular

I enclose \$\_\_\_\_ ☐ Check ☐ Money Order.

No CODs, please.

Name \_\_\_\_\_

Address \_\_\_\_\_



City \_\_\_\_\_ State \_\_\_\_\_

Zip \_\_\_\_\_



# SAVE as much as 80% with **AMT** Quality Power Tools

American Machine & Tool Co., Dept. PM03, 4th Ave. & Spring St., Royersford, PA 19468

Please send me the units checked  
☐ Payment in full enclosed \$ \_\_\_\_\_ or  
☐ \$5.00 deposit each item enclosed, balance  
 C.O.D.; or charge my ☐  ☐ 

Card No. \_\_\_\_\_

Expiration Date \_\_\_\_\_

Signature \_\_\_\_\_ Name \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

- |                                                           |                                                         |
|-----------------------------------------------------------|---------------------------------------------------------|
| <input type="checkbox"/> 8" Tilt Arbor Saw \$52.50        | <input type="checkbox"/> Belt Sander \$52.00            |
| <input type="checkbox"/> Standard rip fence \$6.50        | <input type="checkbox"/> Disc Sander Attachment \$17.00 |
| <input type="checkbox"/> Long Cabinet Rip Fence \$7.50    | <input type="checkbox"/> Mitre Gauge for Sander \$3.50  |
| <input type="checkbox"/> Ball-bearing Spindle \$12.50     | <input type="checkbox"/> Jointer-Planer \$63.30         |
| <input type="checkbox"/> 12" Swing, 4 Ft. Lathe \$67.75   | <input type="checkbox"/> Ball-bearing Spindle \$15.70   |
| <input type="checkbox"/> Ball-bearing Model \$79.50       | <input type="checkbox"/> Spindle Shaper Kit \$44.40     |
| <input type="checkbox"/> Face Plate \$4.50                | <input type="checkbox"/> Drill Press \$29.90            |
| <input type="checkbox"/> Set of 3 Chisels \$11.00         | <input type="checkbox"/> General Electric Motor         |
| <input type="checkbox"/> Set of 8 Turning Chisels \$29.00 | <input type="checkbox"/> \$49.50 (with other item)      |
|                                                           | <input type="checkbox"/> \$54.55 (Purchased Separately) |

## FANTASTIC VALUES WITH THIS COUPON!

**DIRECT FACTORY OFFER AND REVOLUTIONARY PATENTS** decrease costs, increase efficiency. Full scale power tools of heavy duty 100% cast iron and steel. Streamlined design reduces weight, cuts material and production costs. Special patents provide added efficiency, accuracy, savings. Parts made, assembled, tested, packed in our own factories, shipped direct.

**ENDORSED BY AMERICA'S TOP MAGAZINES... OVER 2 MILLION USERS** confirm their precision, versatility and rugged performance.

**\*10-YEAR LIMITED WARRANTY.** Any part or parts of any AMT power tool which become inoperative for any reason within 10 years of the purchase date will be repaired or replaced by the factory. Your only cost: for return postage.

\*Except motors to which the same terms for one year warranty will apply.

**10-DAY MONEY BACK GUARANTEE**

Try any AMT power tool for 10 days. If not fully satisfied, return for full refund of purchase price. We will pay return freight.



### 8" TILT ARBOR POWER SAW

**WORK OF \$150.00 BENCH SAW as is. Converts easily to equal any \$300.00 floor model cabinet units!** Crosscuts, rips, mitres, cuts compound angles, dados, makes coves and moldings.

**\$52.50** f.o.b. factory. Wt. 22 lbs. Including completely assembled cast iron and steel 8" saw with ground cast iron table, blade guard, mitre gauge, Less blade, RIP FENCE, if desired, for easier work alignment, \$6.50 add'l.

**PRECISION BALL BEARING SPINDLE** for commercial service, \$12.50 add'l.

**SAW BLADE TILTS... TABLE STAYS LEVEL.** Lock securely at any angle up to 50°. Raises, lowers, 0° to 2-1/4". Takes standard blade, saw insert removes to take dado heads, if desired for easier work alignment. Standard size (for bench saw) \$6.50, long rip fence for cabinet base (as shown), \$7.50.

**FREE CABINET BASE PLANS** Use bench saw as received (inset photo) ... or transform easily and inexpensively into floor model (as shown) guaranteed to do work of floor models costing \$300. **FREE plans** ... all you'll need are a sheet of 3/4" plywood and 3-4 hours. Use your AMT saw for cutting. Plans provide 27" x 24" work surface, 33" height.

**10-YEAR LIMITED WARRANTY\***



### INDUSTRIAL SIZE 12" SWING 4 FT. WOOD LATHE

**DOES WORK OF \$200 UNITS.**

**\$67.75** Complete as shown.

**10-YEAR LIMITED WARRANTY\***

Comparable in speed, precision and durability to units selling for \$200 and more. 36" between centers. For wood and plastics. Tubular steel bed rails with dual point suspension increase accuracy, ease of operation. Precision ball thrust cup center, heavy spur center, graduated T-rest, 3-Speed pulley for different work diameters. Heavy-duty ball-bearing model \$79.50.

f.o.b. factory. Shipping Wt. 30 lbs. Faceplate (optional) for turning bowls, lamp bases, etc. \$4.50. Set of 3 high speed turning chisels, \$11.00 add'l; Set of 8, \$29.00.



### PRECISION 4" x 36" BELT SANDER

f.o.b. factory Wt. 18 lbs.

**\$52.00** Disc Sander attachment including disc, bracket, ground cast table (tilts 0-45°); \$17.00 add'l.

The world's most talented belt sander. Heavy cast iron sander has belt track and tension control, includes 4" x 36" standard sanding belt. Changes from horizontal to vertical sanding in seconds. Uses 1/3 HP or larger motor.

**10-YEAR LIMITED WARRANTY\***



### 22" LONG, 4-1/8" JOINTER-PLANER

**\$63.30** f.o.b. fact. Wt. 19 lbs. Complete as shown. 100% precision ground cast iron and steel. Professional power planing at a hand tool price. Make faster, more accurate joints & bevels for windows, doors, drawers, square tapered legs. Adjustable precision ground cast iron table. In-feed table adjustable to 1/8" depth of cut; fence adjustable to any angle 0° to 50°; 3 hardened, ground high-speed steel knives. Ball Bearing Spindle: \$15.70 add'l.

**10-YEAR LIMITED WARRANTY\***



### SPINDLE SHAPER KIT with holddown

**\$44.40** f.o.b. factory. Shipping Wt. 6 lbs. Complete less wood parts, motor.

Makes beads, coves, moldings, tongue-and-groove joints, etc. Easy assembly plans. Has sealed greased-for-life ball bearings, adjustable height control, fence assembly. Takes 1/4 HP or larger motor. Standard 1/2" bore cutters available.

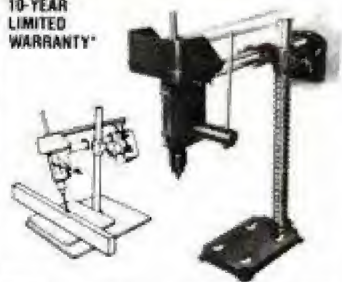
**10-YEAR LIMITED WARRANTY\***

### 32" RADIAL DRILL PRESS

**\$89.90** All cast iron and steel. f.o.b. factory. Wt. 30 lbs. 1/2" capacity Jacob's chuck included.

Industrial quality precision unit with all standard features. Many extras: Head raises, lowers. Depth of throat up to 16". Preset to any angle for on or off table drilling, even horizontal drilling. Complete as shown less motor, belt and motor pulley.

**10-YEAR LIMITED WARRANTY\***



### BRAND NEW MOTOR

Develops a full 1 HP. New General Electric Motor for use with any power tool in this ad. Features 1/2" shaft, 1725 RPM. \$49.50 if purchased with any AMT tool (\$54.55 if purchased separately). Covered by a one year limited warranty, 17 lbs. f.o.b. factory.



## SOLAR AIRSHIP

10 FEET LONG! \$4.95!

Flies on Sun Power



As you need to sun light to fly this blimp, SCIENTIFIC DESIGN and SPACE AGE MATERIAL CAPTURE AND CONVERT SUN'S RAYS INTO KINETIC ENERGY so this GIANT AIRSHIP SOARS HUNDREDS OF FEET INTO THE SKY! Comes with 65-ft. nylon cord. Use additional line to fly higher and longer. Has gone to 10,000 feet in free flight! Nothing to do but inflate with air. Mammoth size never fails to attract attention and the inevitable question: HOW DOES IT FLY? Lasts indefinitely & can be flown over & over again. 2-ft diameter. No-risk money back guarantee. Price \$4.95 ea; 2 or more, \$4.50 ea. Add 75¢ shipping. Johnson Smith Co., Dept. 1009, Mt. Clemens, Mich. 48043.

## Rocking Horse Plan



Build this all-time favorite. Size 25 x 36. Full-size plan & accessories kit available. Kit contains vinyl & foam for padded seat, fur fabric for mane & tail, rings & vinyl for bridle.

PLAN-245 ... \$6.00 ppd. Catalog ... \$1.00.

HA KIT (accessories only) ... \$9.00 ppd.

**ARMOR PRODUCTS**

P.O. Box 290, Dept. C, Deer Park, NY 11729

## LEARN TO BE A DENTAL MECHANIC

**SECURITY PRESTIGE**

Learn at home, in your spare time, to make Crowns, Plates, Bridgework, etc. Dental Mechanics are employed by Dentists, Dental Laboratories or open your own shop, full or spare time. FULL EQUIPMENT OF TOOLS AND MATERIALS INCLUDED WITH COURSE. Low tuition. Easy Terms. Write for FREE BOOK about this career that's not affected by automation.

**THE MCCARRIE SCHOOLS INC.** 215-L09-9155

132 N. 12th St., Dept. PM111 Phila., Pa. 19107

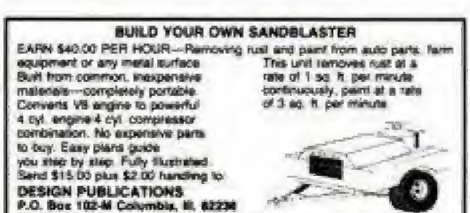


### MANUAL TIRE CHANGER

Fix your own flat tires. Changer breaks bead, demounts and mounts tire on rim. \$199.00 ppd., satisfaction guaranteed. Call or write

**WIKCO INDUSTRIES, INC.**

Rt. 2, Box 154 308-872-5327  
Broken Bow, Nebraska 68822



### BUILD YOUR OWN SANDBLASTER

EARN \$40.00 PER HOUR—Removing rust and paint from auto parts, farm equipment or any metal surface. Built from common, inexpensive materials—completely portable. Converts V8 engine to powerful 4 cyl. engine 4 cyl. compressor combination. No expensive parts to buy. Easy plans guide you step by step. Fully illustrated. Send \$15.00 plus \$2.00 handling to DESIGN PUBLICATIONS, P.O. Box 102-M Columbia, Ill. 62226



### BUILD THIS TRAILER KIT

Bed 76 1/2" x 16". For personal Use or Resale. Heavy duty steel pre-cut. 7000 lb. axles. Guaranteed Haul hay, cars, tractor, freight, etc. Send \$3.00 for brochure, marketing ideas, parts catalog etc.

**TRAILER MAKER 1229 No. Jefferson Bldg. C Mt. Pleasant, Texas 75455 Ph. 214/572-5092**

**AMERICAN MACHINE & TOOL CO., INC., 4th Ave. & Spring St., Royersford, PA 19468**

Visit our Royersford FACTORY SHOWROOM for these same low prices. 4th and Spring Sts. From 9 to 4:30 on weekdays and 9 to 12 on Sat.



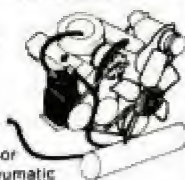
## READY AIR

The affordable 150 psi air compressor that mounts right onto your engine.

- equal to 1 hp shop compressor
- operates most hand held pneumatic power tools
- quickly inflates tires
- mounts out of sight
- uses no passenger or load space
- easy to install on most popular 2WD & 4WD trucks up to 1 ton
- complete kits from \$390.00

Call or write for free information or to order direct.

**THEROLD INDUSTRIES**  
500 E. 7th Street  
Holtville, California 92230  
619/356-1060



## Learn how to Program and Use PERSONAL COMPUTERS



Now at Home in Spare Time, you can learn everything you always wanted to know about personal computers. How to program in BASIC. How to understand and use BASIC commands. How to write and run your own programs. How to adapt existing software to your needs. Complete Course Includes Your Own Computer. More than just another programming manual, this is a comprehensive home-study course written by experts. No need to quit your job or school. You learn everything right in your own home, without attending a single class! And to give you hands-on experience, we include your own computer—the Timex 1000 with 16k memory module—plus cassette recorder so you can save your programs on tape. Send for Free Facts. Mail Coupon Today!



NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY/STATE/ZIP \_\_\_\_\_

COMPUTER TRAINING, Dept. P8093  
Scranton, PA 18515

## FREE TOOL CATALOG

### Fine Woodworking Tools

Send for your FREE copy of our new color-fol catalog. Fully illustrated with the finest woodworking tools, supplies, books, hardware, and more. Satisfaction Guaranteed. Write today for your FREE catalog.



**WOODCRAFT**

Dept. PM103  
41 Atlantic Avenue, Box 4000  
Woburn, Massachusetts 01888

## SELF-POWERED TIMING LIGHT WITH CAPACITIVE PICKUP CLIP



ONLY \$34.95  
plus \$2.00 Shipping

By using two 1.5V size D batteries (not included) we get rid of two clumsy power cords and no more trouble of +/- polarity. Ideal for vehicles or boats where battery is not accessible. It works on all voltage systems — 6, 12, 24, 36 and magnetos. Extra feature: it can be used as emergency flasher with amber filter attachment included.

30 days money-back guarantee  
1 year manufacturer warranty

MARVIN ELECTRONICS (USA) INC. 10/83  
P.O. BOX 1438, MONTEREY PARK, CA 91754

☐ CHECK ☐ MONEY ORDER  
CHARGE: ☐ VISA ☐ MASTERCARD  
CARD NO. \_\_\_\_\_  
EXP. DATE \_\_\_\_\_  
NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY, STATE, ZIP \_\_\_\_\_  
SIGN HERE \_\_\_\_\_  
(CREDIT CARD ONLY)  
CA. RESIDENTS ADD 6% SALES TAX  
PLEASE ALLOW 4-6 WEEKS FOR DELIVERY

## Now Save 20% on a famous TROY-BILT® Tiller!



Just ONE HAND!

"Off-Season" Savings now in effect! Right now is the best time ever to learn about the amazing TROY-BILT Roto Tiller-Power Composter...the "break-through" machine that's allowing anyone — of any age — with any soil — to easily have a fabulously fertile, productive garden! For free complete details, prices, write today to:

TROY-BILT 102nd St. & 9th Ave., Troy, NY 12180.  
© 1983 Garden Way, Inc.

TROY-BILT® Roto Tiller-Power Composters  
Dept. A1899  
102nd St. & 9th Ave., Troy, N.Y. 12180

Please send the whole wonderful story of TROY-BILT® Roto Tillers including prices and OFF-SEASON-SAVINGS now in effect for a limited time.

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_  
STATE \_\_\_\_\_ ZIP \_\_\_\_\_

## TRX Anti Fog Composition

DEVELOPED FOR N.A.S.A. Space Program. Outstanding for automotive and boating uses, eyeglasses, mirrors, etc. Featured in Popular Mechanics, June 1982, page 33. Send \$2.50 for a one ounce bottle or order large 8 ounce bottle for only \$6.50; plus \$1.00 shipping and handling, per order. 8 & 8 Distributors  
P. O. Box 33181 Washington, DC 20033  
Dealer Inquiries Welcome

## NON-GUNS!

That's right, these precision-built replicas of famous firearms CANNOT CHAMBER OR FIRE REAL AMMUNITION! Made of machined metal, they look, feel and weigh same as the originals. CAN BE DISASSEMBLED. Over 30 sized, hand-finished parts. Comes fully assembled. Safe and perfect for display. MONEY BACK GUARANTEE. Send for FREE Catalog of over 60 different models. Model shown: Q&S, SO&V, 45 AUTOMATIC, CO104H-300 \$55 (3.00)  
The COLLECTOR'S ARMOURY, Inc., Dept. PM  
810 SLATERS LANE, ALEXANDRIA, VIRGINIA 22312 (703) 544-1100



## HOT WIRE CUTTER FOR STYROFOAM STYRO CUT 3D

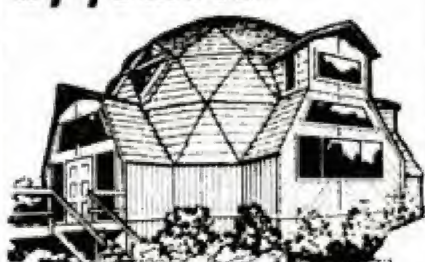
Cuts any shape with any steel wire 0.5-1mm dia.  
hobby products co. \$69.95  
Call: P.O. Box 07846 Columbus OH 43207 614/445-9621



Let me show you  
**HOW TO SPEAK AND WRITE LIKE A COLLEGE GRADUATE**

I have helped thousands of men and women who have not had college training in English to become effective speakers, writers, and conversationalists. With the new C.I. METHOD, you can stop making mistakes, build-up your vocabulary, speed up your reading, develop winning skill, learn the "secrets" of conversation. You don't have to go back to school. Takes only 15 minutes a day at home. Costs little. 32-page booklet mailed FREE upon request. Send card or letter TODAY!  
Don Bolander, Career Institute, Dept. 110-103,  
1500 Cardinal Drive, Little Falls, N.J. 07424.

## Build this beautiful Dome Home by yourself!



### Enjoy super affordable payments and low energy bills

Save up to 60% on building costs and up to 50% on utilities. Beautiful Monterey Domes geodesic home kits are extremely energy-efficient, unbelievably strong, earthquake resistant, and easy to assemble. No special tools or skills necessary. Our unique, patented building system makes home construction a reality for the novice. Monterey Domes pre-cut, color-coded shell packages start at \$3995. Models up to 3,500 sq. ft. Send for our exciting color Catalog & Plans Book — over 90 fact-filled pages of beautiful affordable homes.

Write today! Monterey Domes, Inc., 1760 Chicago Dept. AQ-10, Riverside, Calif. 92517

☐ Rush me your 90 page CATALOG & PLANS BOOK. Enclosed is \$6.00, postage included.  
☐ Also send your ASSEMBLY MANUAL for an additional \$5.00.  
NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY, STATE, ZIP \_\_\_\_\_  
Mail To: MONTEREY DOMES, INC.  
1760 Chicago, Dept. AQ-10  
Riverside, Calif. 92517





## The American Clock Builder

**NEW!**  
100 PAGE  
CATALOG  
\$2.00 ppd.  
(Refunded with  
your first order)

**LOWEST  
PRICES  
IN THE  
U.S.A.**

### LARGEST SELECTION!

- Do-It-Yourself Clock Kits
- Imported Brass Movements
- Quartz Movements
- Music Box Movements
- Finishing Supplies and Tools

### Solid Oak School Clock

Only \$19.95  
(plus \$2.50 shipping)

#### 1733 X01 Complete Kit Includes:

- Solid Oak Parts
- Quartz Movement
- Metal Dial and Hands
- Convex Glass
- Antiqued Eagle

WRITE OR  
CALL TODAY! 1-312-584-9600



17" H x  
11-1/8" W x  
1-1/2" D

## Craft Products Co.

CLOCK BUILDERS' SUPPLIES

Dept. PM3C, 2200 Dean St., St. Charles, IL 60174  
Serving America's Craftsman Since 1940

## BLAUPUNKT CAR AUDIO

Prices that are unbeatable:

- Frankfurt
- Seattle
- Richmond
- Tuscon
- Washington
- Berlin
- Hirschman Antennas
- Isophon Loudspeakers
- Becker Radios
- Ungo & Theft Guard Alarm Systems
- Equalizers

Plus Marantz, Sanyo, Mitsubishi

### WALTER ODEMER CO., INC.

please call toll free:

800-227-9511 (Cal.) 800-423-2075 (Out of State)

1516 W. Magnolia Blvd. Burbank, CA 91506



### Gas to Electric Conversion Kit

GAS LAMP BURNS \$72 TO \$120 OF GAS PER YEAR. OUR CONVERSION KIT OPERATES ON THE COST OF GAS. Easy to install 2-bulb fixture duplicates the charm and increases the light output of any gas light. Includes automatic On At-Dusk—Off At-Dawn photo electric control. Available in 12 volt or 115 volt.

FOR MORE INFO WRITE:

### Gaslight Conversions, Inc.

1039 CHARLES AVE. ST., PAUL, MN 55104

#### EMCO COMPACT 5" x 14" C.C.



TURNING MILLING  
DRILLING THREADING  
BORING DIVIDING

LATHES 3" TO 15"  
MILLS, DRILL PRESSES,  
GRINDERS... LATHES  
CATALOG \$1.00 Precision  
Tools, Inch or Metric,  
Aluminum, Brass, Steel  
- all shapes. Small Screws,  
taps, drills, Saws, Collets  
... TOOL CATALOG \$1.00  
CAMPBELL TOOLS CO.  
21000 Selma Road  
Springfield, Ohio  
(513) 522-8562

## BURRO

Fiberglass  
Travel Trailer Kit

Build Yourself! Save Gas



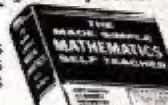
TRAILER FOR THE '80's—Burro Travel Trailer kit sleeps four. Under 1,000 lbs. Fiberglass. Ready to tow. Finish interior only. Write Burro PM10, 14143 21st Avenue North, Plymouth, MN 55441. For full color catalog send \$3.00 to cover handling. Rental Opportunities.

## MADE SIMPLE MATH Self Teacher

New Short Cut Math Skills in Only Weeks  
—10 minutes a day ... for Higher Pay Jobs.

### Pocket "Math-Wizard"

BONUS! with Math book! Get the Right Answers Fast Without Paper or Pencil! Convert fractions into decimals, percentages and reverse, plus other tough math problems solved in a jiffy!



One volume contains all subjects—arithmetic, algebra, geometry, trigonometry through calculus. Tackle any math problem even if you never finished high school. Basic and advanced math taught in terms of everyday experience. Clearly presented step-by-step and illustrated. Learn theory

and practice from "scratch", "brush-up", or reference. Summary makes review easy. Track your progress. Catch errors instantly. Pass civil service and job tests. A must for all office, sales, industrial jobs, home finances. Send \$9.95 plus 95¢ for shipping. 30 day Money Back Guarantee.

VALCO • Dept. 972 • Box 2012, New Rochelle, NY 10802

## Full-Size TRADITIONAL ROCKING HORSE PLAN



Bring back the magic of childhood using our full-size plan for the Traditional Rocking Horse. Easy to build—body, legs and head are shaped using files. Rockers are curved for maximum action and shaped for desirable safety. Use one or any available hardwood—paint to resemble live pony. Tomorrow's treasure today!

Plan No. 121 \$9.00

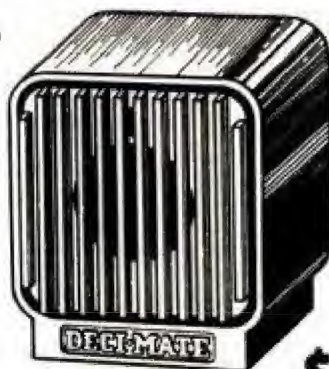
CATALOG  
170 diff. full-size prof.  
furniture plans—\$2.00  
(catalog free with order)

FURNITURE DESIGNS, Dept. PZ-103  
1425 Sherman Ave., Evanston, IL 60201

## Pests R Gone™ with Decimate

Ants, rats, mice, roaches, fleas, bats, spiders, etc. etc. What a pain they can be! You can fumigate them, poison them, trap them, etc. But what do you do with those dead and unsightly things? And those poisons can be harmful to humans and pets. Bentley's knows a better way! DECIMATE delivers an ultrasonic sound that cannot be heard by humans or pets. It is completely harmless. But it is another story to all those pests and varmints. It drives them looney! DECIMATE causes them extreme discomfort and pain. Would you take this kind of treatment? Heck no. And neither will they. In just a few weeks all those pests and varmints just leave and never come back.

Just plug the EPA and UL approved DECIMATE 500C (the biggest unit) into any AC outlet and in a few short weeks those pests will be gone forever. (Beware of units of low intensity and constant frequency). DECIMATE sweeps two levels from 25,000 to 65,000 kHz in each cycle. It protects 3,500 ft.<sup>2</sup> or 25,000 ft.<sup>2</sup>. It uses less than 5 watts of power. DECIMATE, the pioneer in ultrasound pest control, has rid tens of thousands of homes and plants of pests. One year limited manufacturers warranty. Try it for 30 days and if you are not 100% satisfied return it for a prompt refund.



just  
\$69

### ORDER TOLL FREE

24 hours 7 days a week

800-227-1617

in California: 800-772-3545

For fast service major credit card holders ask for extension 656. Order DE 1787 for Decimate 500C or send check for \$69 plus \$2.95 for delivery. California residents add 6% sales tax.

## Bentley's

FOR BETTER LIVING™

735 Burnett Ave., Box 31445,  
San Francisco, CA 94131

- One piece port phone
- Tuner or auto
- Ringers on off
- Dual or auto
- Last number redial
- \$14.95 + \$2.50 postage & handling

Code A Phone 7200

- Cordless
- Long range
- approximately 700'
- Last number redial
- One year warranty
- \$119.95 + \$2.50 postage & handling

All phones FCC approval. Ohio Residents add 6.5% tax  
Others available. Send check or money order to: D. A. Smith's  
Dept. P999, 2801 Maplecrest, Cleveland, Ohio 44122

## Satellite TV Price Breakthru!



Complete microwave system, \$149.  
\$100 receiver, 10-ft antenna, \$295.  
Best Set TV consumer report/manual available reveals top sources, lowest prices on equipment, kits, plans, portable systems, for authorized TV reception only. 8 1/2 x 11, illustrated. \$9.95 ea. + \$1.50 ship. Johnson Smith Co., Dept. 1010, Mt. Clemens, Mich. 48043.

## GREAT SAUSAGE RECIPES

227 page illustrated book explains sausage making plus home curing and smoking of meat, fowl and fish. Over 100 recipes. We now have Low Salt Seasonings. Free equipment and supply catalog has more information.

### The SAUSAGEMAKER

177-6 Military Road

Buffalo, N.Y. 14207



## Roll Top Desk Plan



**FULL-SIZE PLAN** includes instructions for pedestal base & upper tambour roll top with bookshelf. Desk has 2 pull-out manuscript boards & 7 drawers, two with suspension files. Full size template for tambour is included. Size is 21" x 55" x 48" high. Price is \$12.50.  
**ARMOR PRODUCTS**  
 P.O. Box 290, Dept. C, Deer Park, NY 11729

**KNOW WHO'S COMING**

Vehicle Announcer signals arrival of strangers or friends. No unwanted surprises. \$194.95 unit includes underground sensor, 100 ft. of cable and interior control. Shipping \$4.50, MN Res. 6% S.T.

**MASTER CHARGE VISA**

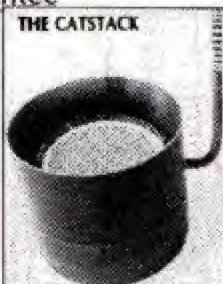
**WINLAND Inc.**  
 Box 473, Mankato, MN 56001  
 (507) 625-7231

## Convert your woodstove to a CATALYTIC BURNER

- Burn less wood
- Reduce creosote up to 90%
- Fits most stoves
- Easy to install
- 5 year guarantee

For information write to:

**CAT ENGINEERING**  
 RT. 6, BOX 131  
 ELIZABETHTON, TN.  
 37643  
 615-282-2929



## CALL TOLL FREE NOW!

### AMAZING VINYL REPAIR

— \$10 to \$20 in an hour!

Big earnings, repeat business. Car shops, homes, motels, restaurants, bars, etc. **FREE FACTS BY MAIL**

Call toll free 1-800-621-6633 (Ill. 1-800-572-0444) or write VIP, 2021 Montrose, Dept. 182, Chicago, IL 60618

## SMALL PRECISION LATHES

For Metal Working or Plastics  
 See Your Dealer—Unimat 3"—259  
 Compact 5"—795—Refund Guaranteed  
 Send for **FREE** Catalog. Order From:



**HOBBY PRODUCTS COMPANY**  
 Dept. S.A. P.O. Box 67846  
 Columbus OH 43207  
 614/445-9621

## FREE 20 Piece Screwdriver/Socket/Allen Key Set

with all orders of 3 or more of the **MIGHTY WRENCH!**

—The Only Wrench You'll Ever Need—

Fits Virtually Every Nut & Bolt in Your Home, Car or Office

- ★ Fits all nuts & bolts from 3/8" to 13/16" 9-22 MM
- ★ Loosens rusted-on bolts and stripped bolts
- ★ The perfect emergency tool:

- Compact size
- Lightweight
- Versatile

\*Hardened Chrome-Coat Metal Alloy  
**GUARANTEED FOR A LIFETIME** of normal usage

\*Mighty Wrench automatically adjusts itself to the size of the bolt & the grip increases as the turning gets tougher!!



\$5.50

**FREE!!!**

Buy Direct & Save—

**Mighty Wrench is not yet found in stores.**

**Ebon Tool & Die Manufacturing**

100 East Old Country Road Dept. H10  
 Mineola, N.Y. 11501

----- Please make check payable to **Ebon** -----  
**ORDER THREE OR MORE AND RECEIVE A 20 PIECE SCREWDRIVER/SOCKET/ALLEN KEY SET IN HANDSOME PROTECTIVE CARRYING CASE ABSOLUTELY FREE!!!**

- ☐ \$5.50 + \$1.50 postage/handling for one Mighty Wrench
- ☐ \$10.50 + \$1.95 postage/handling for two Mighty Wrenches
- ☐ \$14.85 + \$3.50 postage/handling for three Mighty Wrenches + my **FREE** 20 piece screwdriver/socket/Allen key set
- ☐ \$6.95 + \$1.95 postage/handling 20 piece screwdriver/socket/Allen key set

Include separate sheet with:

—Name, Address, City, State and Zip

—If charging to Master Card or Visa, be sure to include card number and expiration date.

—RETAIL/TRADE INQUIRIES WELCOME—

## BALL END HEX SET



**UNIQUE! VERSATILE!**  
 THE TOOL YOU'VE BEEN WAITING FOR. THE PERFECT ADDITION TO YOUR TOOL SHOP.

Designed to reach into the most awkward places and still get a firm seat... at angles up to 30°. Made of top grade alloy steel, heat treated and tempered, these hex key sets by VACO are known world wide for their quality.

**WORKS ON ANGLES UP TO 30°**

### The ball-end hex key driver set and pouch

The ball-end hex key driver set contains the 12 most popular size hex keys, each firmly mounted in the exclusive VACO

comfort dome driver handle. The drivers come in a handy roll-up pouch that's perfect for carrying or storage and rolls open for use on the job.

Order a set today, you'll wonder how you ever did without it.

Just send check or money order (no cash please) or you can charge them to your VISA or MasterCard

Reg. \$35.00  
**NOW \$29.00**

**Hi-TEK TOOLS U.S.A.**  
 P.O. Box 402, Northbrook, IL 60062

Send me \_\_\_\_\_ ball-end driver hex key set(s)

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

☐ My check or money order is enclosed

Charge my ☐ VISA ☐ MasterCard

Account No \_\_\_\_\_

Expiration date of card \_\_\_\_\_

## NOW! CLIMB with Super Step



"Beats Walking · Jogging · Cycling"

- Better Exercise
- No Shock
- Portable
- Adjustable Heights
- Lose weight fast
- Sets up in seconds
- Built to last

**\$99.00**

Ankle Weights Included



**SUPER STEP**

700 Orange St  
 Wilmington, DE 19801

Dear **Super Step**,

Please send me \_\_\_\_\_ quality Super Step(s) at your low-price of \$99.00 (Plus \$11.00 shipping and handling per unit)

**Check One** Payment Enclosed

Charge this purchase to ☐ VISA

☐ AMERICAN EXPRESS ☐ MASTERCARD

For faster service call TOLL FREE 1-800-441-7098

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Account# \_\_\_\_\_

Exp. Date \_\_\_\_\_

## These 3 BIG DRAFTING KITS included...

when you train with us for a

## WONDERFUL JOB IN DRAFTING



Accredited National Home Study Council

APPROVED FOR VETERANS

Maybe you can find a job that pays better, but I don't think you'll ever find a job that gives you more satisfaction that you are making a big contribution to your community. This home-study plan was designed to help beginners get jobs with security and prestige as draftsmen. It's easy with our exclusive step-by-step instruction. Everything shown here is included with course.

**RUSH COUPON FOR FREE KIT!**

Mail coupon for **FREE "DRAFTING CAREER KIT"**, Drafting Aptitude Test. Graduation from this course does not insure that you will get a job. To find out how our graduates have done, send for survey showing employment success of our graduates.

**CAREERS in DRAFTING**

**APTITUDE TEST**

Careers by Home Study

**NORTH AMERICAN SCHOOL OF DRAFTING**, Dept. P8083  
 4400 Campus Drive, Newport Beach, CA 92660  
 Rush "DRAFTING CAREER KIT," including folder, Aptitude Test & Drafting Instrument — **ALL FREE!**

NAME \_\_\_\_\_ AGE \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

PHONE ( ) \_\_\_\_\_



## WOODWORKERS!

A magazine for both novice and veteran bringing you over 75 project plans per year...for building the best of Early American, Shaker, English, Contemporary furniture, clocks, toys, lamps, gifts and much more...

ALL FOR LESS THAN 20¢ PER PLAN

PLUS Regular articles on shop tips, jig-building, finishing techniques and money-making ideas.

1 YEAR (6 bimonthly issues)—only \$12.00  
2 YEARS (12 bimonthly issues)—only \$22.00  
Foreign Rates: 1 year—\$14.00, 2 years—\$26.00  
(Please make payment in U.S. Funds)

The Woodworker's Journal

P.O. BOX 1629-310 NEW MILFORD, CT 06776

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

money back if you're not satisfied

## Build Your Own Gas Grill

- Can be built with simple tools.
- Parts easy to obtain at little or no expense.
- For detailed plans send \$4.00 to:

EASY GRILL

P.O. Box 83

Windom, MN. 56101



## Be an ELECTRICIAN

**MAINTENANCE CONTRACTOR CONSTRUCTION** Make more money! Check out Electrician's wages against the kind of money you make now!

**TRAIN AT HOME IN SPARE TIME** Make extra money in spare time while you train for a full-time job. Do odd jobs for friends and neighbors. Save money doing your own electrical work. Learn everything from repairs and maintenance to complete electrical installations. No previous experience needed. Everything explained in easy-to-understand language with plenty of drawings, diagrams and photos. Tools, materials, test equipment included with course. Approved for Veterans and G.I.'s. Be ready to take almost any electrician licensing examination offered by state, city or county. No cost, no obligation, no salesman will call!

**MAIL COUPON TODAY!**

Electrician School, Dept. P0093  
ICS Center, Scranton, PA 18515

Rush free facts that tell how I can train at home to be an electrician.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY/STATE/ZIP \_\_\_\_\_



## FREE Anti-theft Catalog

Over 100 Name brand anti-theft systems to protect your car  
Biggest selection • Lowest prices • Complete product descriptions  
• 24 hour shipping • Master Card, Visa, American Express • Money back guarantee • Dealer inquiries invited

Louisville Lock & Key

39260 Shelbyville Road  
Louisville, Ky. 40207  
1-800-626-2611

Mail coupon or call toll free

- ☐ Free catalog by 3rd class mail (3 - 4 weeks)
- ☐ \$1 enclosed for 1st class mail (3 - 5 days)

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_

## 2nd MOST IMPORTANT TOOL FOR EVERY WOODWORKING SHOP

VERSATILE **W&H** MOLDER-PLANER

Almost as basic as your saw... molds, planes, rabbets.

From \$430

- Master Charge
- VISA



FREE BROCHURE

WILLIAMS & HUSSEY MACHINE CO.

Dept. 17, Milford, N. H. 03055

(603) 673-3446

## RUPTURE APPLIANCES

FOR COMFORT!

When you slip into a genuine BROOKS Appliance you can enjoy heavenly comfort night and day at work or at play! Thirteen million sold, since 1880. You buy direct from the factory - never sold in stores - beware of imitations. Only the highest quality materials and workmanship. (Especially for older people who wish to avoid unnecessary operations for reducible rupture). Send for our FREE illustrated booklet with no obligation.

BROOKS APPLIANCE COMPANY (Medicare Pays 80%)  
Dept. 821, Marshall, Mich. 49068



## AMAZING SCIENTIFIC and ELECTRONIC DEVICES

PHASER shockwave and invisible FORCE FIELD generators. LASERS for weapons, cutting, burning, cloud writing, holography and special effects. NUCLEAR particle accelerators and detectors. PLASMA, ION, HIGH VOLTAGE, HIGH FREQUENCY TESLA COILS and LIGHTNING generators. TRANSMITTERS and CONTROL devices for security, telephones, intrusion detection, nature listening. PLUS PLUS INFRASONICS, ULTRASONICS, ENERGY, CHEMICAL and PERSONAL PROTECTION and SAFETY DEVICES. SEND \$1 for catalog of plans, kits and completed items to:

INFORMATION UNLIMITED, INC.

P.O. Box 716, Dept. M8

Amherst, N. H. 03031

## ATV Dump Cart

Haul 1/2-ton loads with your ATV.

Carl Heald 1/2-ton dump cart features:

- 14 cu. ft., 48" x 44" x 12" dump box
- Roller bearing mounted wheels • Universal hitch
- Low pressure ATV flotation tires • 1" axle
- Three-way tail gate • And BIG KIT SAVINGS.

For FREE catalog call 1-800-253-1030 or write:

Carl Heald, Inc., (in MI 616-849-3400)  
Dept. N25, PO BOX 1148,  
BENTON HARBOR, MI 49022-1148



\$299.95 kit price

YOU SAVE ASSEMBLY COSTS by bolting cart together.

## BUILD YOUR OWN JET HELICOPTER EASY TO FLY—INEXPENSIVE TO BUILD!



- Carries one person-plus
- Simple hand-tool assembly
- Uses low-cost fuel

Plans—completely illustrated: \$9.00

The HELICOPTER HOBBYBOOK includes Plans for building a piston-engine-powered Helicopter (illus.). \$8.00.

BOTH ABOVE BOOKS: only \$14.00

HELICRAFT, Inc.

P.O. Box 16468

Baltimore, MD 21217

## WOODEN TOY PLANS



Unusual toys made easy. 18 complete plans in large lie-flat book. Camper, Riding Mower, Mail Truck shown. Parts drawings, dimensions, step by step instructions included.

Makes great gift! Check with order. Prepaid. Only \$7.25 each. CLAYT'S PLANS, P.O. Box 1056, Jupiter, FL 33468-1056

## DISH ANTENNA DOWNCONVERTER RECEIVER 397

New "Deep Dish Antenna" MDS complete receiving system ready for TV hookup. All TV cables included.

TOTAL PKG

Satellite TV, Inc.

For Authorized TV Reception Only

P.O. Box 3108, Dept. M-10, Delray Beach, FL 33447. Send your REFERENCE BOOK for \$11.95 plus \$2.95 shipping & insurance (U.S. funds) or call our 24-hour C.O.D. Order Line (305) 276-2941

Name \_\_\_\_\_



## Satellite TV

NEW! 4-ft. (48 INCH DISH) SATELLITE TV COMPLETE RECEIVING SYSTEM.

It's finally arrived. THE 4-FOOT COMPLETE HOME SATELLITE TV SYSTEM. Antennas. Receivers. Sources. Photos. Our BOOK takes the mystery out of satellite technology. The prestigious Mass. Inst. of Technology, U.S. Army, Navy and libraries worldwide have purchased our BOOK.

## SAVE 40% ON TOP QUALITY CHAINSAW PARTS



Chain, bars and sprockets to fit all saw makes. As good or better than original parts. Plus tools and woodstoves. Warehouses in CA, PA and FL. Free 32 page catalog. Write: Catalog office Box 15129, Dept. 61803 Sacramento, CA 95851

(Dealers inquire—send sales tax no.)

Splits EASIER & FASTER! **THE BOSS LOG SPLITTER!**  
Only \$49.95 plus \$8 p. & h. for adaptable cone. or \$99.95 plus \$10 ready-to-attach to hub of car or light truck (specify vehicle). Pa.—send 6% sales tax. Free info—send stamped self addressed envelope. Good Products, Route 3 Box 88-A PM. Kutztown, Pa. 19530

**The Toymaker Supply Co.**  
Largest selection of wood toy patterns/parts/books  
CATALOG \$1  
Lake Forest Rd., Dept. 80  
Tahoe City, CA 95730



# CLASSIFIED ADVERTISEMENTS

Sophie Gronowicz, Classified Sales Manager Kathy Cusumano, Classified Service Manager

Rate: \$5.70 per word payable in advance each insertion. Minimum insertion ten words.

Bold face capitalized words—\$1.00 per word additional (First word set in Bold Face at no extra charge, Zip Code Free.)

The next available issue to place an advertisement in America's No. 1 Classified Section is **DECEMBER**. The closing is **OCTOBER 5th**.

Send remittance payable and order to Popular Mechanics, Classified Department, 224 West 57th Street, New York, New York 10019.

Please indicate Heading under which ad is to appear. As a consumer service and in cooperation with our mail-order advertisers

who use post office box addresses for their convenience in handling your order, Popular Mechanics maintains a register of such mail-order advertisers containing their complete names and street addresses.

Advertisers using P.O. Box number must furnish complete name and street address for our records.

To avoid delay in the publication of your ad, please send descriptive materials with your request.

## CHRISTMAS GIFT SHOPPING

**FREE FULL COLOR** Gift Catalog Loaded With Christmas Items. Rocket's House Of Gifts, Dept. LR, P.O. Box 359, Portage, WI 53901

**FREE CATALOG.** Distinctive gifts by mail. Write: **NINA NICHOLS**, 14937-2 Salicoy, Van Nuys, CA 91405

**ONYX CHESS BOARDS,** Chess Tables, Book Ends. **FREE** Brochure (Stamped Envelope). 2906 Southview Rd., Ellicott City, MD. 21043

**FREE** Distinctive Gift Catalog. First State Gifts, RD 3 Box 246M, Dover, Del. 19901

**FREE CHRISTMAS CATALOG** - Fascinating Gifts - Buy Three, Fourth Free - Ultrasales, Box 1233M, New York, NY 10185

**FINE CANDY AND CONFECTIONS MAKE GREAT BUSINESS GIFTS, FREE 32-PAGE CATALOG.** Arlington Candy Co., P.O. Box 226, Woburn, MA 01801.

**SPECIALS** Quality Seasonal Gifts. Guaranteed. Proven Sellers. Free Catalogue. Lusk Associates, 80-10PM Overbrook, Asheville, N.C. 28805

**DISCOUNTS** . . . Bonuses! Quality Merchandise. Large Selection. Catalog \$1.00, Refundable. Marketing, Box 281, Iola, KS 66749.

**PERFECT** Gifts, Wide Variety. Catalogue, \$1.00, Refundable. Galaxy Company, Box 4394, Modesto, CA 95352-4394.

**CATALOG** Loaded with Christmas Gifts. Write: Berkley House, 817 New York, Martinsburg, WV 25401

**FUTURE ANTIQUES**-Handcrafted Toys And Gifts-Catalog \$1.00 (refundable). Ell Creek, P.O. Box 572, Dept. PM-1, Gresham, Oregon 97030

**NEW EXCLUSIVE** Solid Brass Photo Frames. Excellent Lifetime Gift. Free Brochure. Fe Chauncey, Box 11012, Oakland, CA 94611.

## AUTOMOBILES

**CAR** owner's maintenance log, \$1.00. Knight Media, 60 Benzling, Antioch, TN 37013.

**HOW** to rustproof your car or truck yourself for under \$25.00. Send \$5.95 to: C and N Enterprise, 36 York Street, Bradford, PA 16701

**SUPER** mileage carburetors! Free report. PM10, Box 30682, Amarillo, TX 79120

**AUTO** - Care 38 Easy Chemical **FORMULAS** Money-Make Save-Money \$10.00. HOLYBA, Box 420154PM, Miami, FL 33242-0154

**OLD CAR FANS:** subscribe to **HEMMINGS MOTOR NEWS**, world's largest old car marketplace since 1954. Over 450 pages of ads each month, crammed with thousands of old cars for sale—plus parts, literature, restoration shops and more. Only \$15.50 for 12 giant issues. Subscribe to the 'bible' of old car nuts today. Send to: Hemmings Motor News, Dept. 141, Box 100, Bennington, Vermont 05201

**RADIATOR SHUTTERS,** Autos, Trucks. Faster Warm-Up. Increases Engine Life, Mileage, Heater Output. Plans \$10. Raditech, 2516 N.E. 168th, Seattle, WA 98155

**STOP PINGING.** Save. Proven Octane Booster Formulas \$4.95. Beep, 13433 N. E. 20th, Suite E331, Bellevue, WA 98005

**YOU CAN PROTECT YOURSELF FROM FATAL CARBON MONOXIDE POISONING. AUTOS, HEATING SOURCES, AVIATION APPROVED, \$5.75. AMERICAN IDEAS, CO DETECTOR, 2490 ZERO DRIVE, BROOKSVILLE, FL 33512**

**FACTUAL REPORTS**—"Backyard Alcohol Fuel"—10¢ Gal-  
lon." "Stop Oil Burning—Older Cars!" Both—\$1.00.  
Research, Box PJ, Antioch, Tennessee 37013

**FREE 1984 OLD CARS CALENDAR!** Subscribe to Old  
Cars Weekly for 1 year. Get the best in automotive writing, old  
cars photos, columns. \$17.50 for 52 issues plus calendar. Old  
Cars Weekly, Dept. BMB, Iola, WI 54990.

**PROTECT** Car and Contents \$29.95, Roy Dial, Rt. 1, Box  
207A, Brewster, Washington 98812

**CORVETTE WALL CLOCKS:** Write For Your Free Bro-  
chure: Daghestanian Clocks, 31300 Via Colinas #106,  
Westlake-Village, Calif. 91362

**TOYOTA, DATSUN, HONDA OWNERS! BUY NEW CAR  
PARTS AT BIG DISCOUNTS.** Example: Alternators \$24.98,  
Fenders \$58.00. 1000's of items available. Replacement  
guarantee. Accept Visa, Mastercard. Send \$3.00 for catalog.  
JFM-Discount Auto Parts, Box 2247, Joliet, IL 60436

**VAPOKARB!!** - Fantastic New Vapor Carburetor! - Details  
**FREE** - DynaTek B10. 720 Jordan, Rockford, Illinois 61106

**GET** Free Motor Oil for Life. Details, Send SASE and \$1.00.  
TSM, 4975C Plover, St. Louis, MO 63120

**671 MPG.** Ray Covey's Carburetor does it in Chrysler 400  
Cid. V8. Learn How. Send 25¢. H&A, R2PM, Bowling Green,  
MO 63334

**"RIDE ROLLERCOASTER CAR"**—Report. New. Autom-  
obile changes unnecessary. Gives real "Rollercoaster" effect.  
Easy. Inexpensive. Complete details, \$4.00 to:  
"ROLLERCOASTER", Route 3, Box 202, Elon College, N.C.  
27244

**WORLD'S** Finest Friction-Reducing Treatment Doubles  
Mileage Potential. Free proof. Almquist, GT10GA, Millford,  
Pennsylvania 18337.

**NEW** Way To Get 20% More MPG. Cars With AC, only.  
Send \$6.95 to: Dan Rogers, P.O. Box 2934, Farmington,  
Mich. 48018-0934

**PROPANE GARAGE HEATER**— Build for \$25.00. 0-  
750,000 + BTU's. Plans \$5.00. J&P Enterprises, P.O. Box  
11045, Tacoma, WA 98411

**HIGH** Mileage Carburetors. Free Details. Box 89, Draper,  
Utah 84020-0589.

**SAVE GASOLINE!!** Bypass pollution devices - - easily,  
reversibly! Posco (GB-10), LaGrangeville, NY 12540

## AUTO SUPPLIES & EQUIPMENT

**AMERICAN JOBS ARE WORTH SAYING!** Send \$3.00 for  
2 Union Made Bumper Stickers "Stop the Drain on American  
Jobs", "Keep America Strong - Build Union - Buy Made in  
U.S.A.", 2 Hard Hat Decals "American Flag" & "Keep America  
Strong". H. H. Company, P. O. Box 64071, Virginia Beach,  
Virginia 23464.

**HYDRAULIC JACK** Repair Manuals and Kits. Catalog  
\$2.00. Hydraulic Jack Inc., P.O. Box 18, Accord, NY 12404

**ALTERNATOR** Generator Rebuilding Book. Price:  
Hedlund Engineering, Box 26024, Las Vegas, NV. 89126.

**PERSONALIZED LICENSE PLATES.** Design your own.  
Print Clearly Words or Names you Desire. With Colors  
includes Chrome Frame Bolts and Plexi-shield - Send \$10.00  
to: D & K Enterprises, Box 341, Middleton, MA. 01949

**SAVE BIG ON NEW WINDSHIELDS — INSTALLING  
INSTRUCTIONS INCLUDED — TOP QUALITY AUTO  
GLASS — SIDE — BACK GLASS TOO! FAST DELIVERY  
— FREE ESTIMATES — CALL COLLECT NOW! 1-219-  
769-4593 — OWEN'S AUTO GLASS, MERRILLVILLE,  
INDIANA 46410**

**RESTORING AN OLD CAR?** Hundreds of Body Tools/  
Supplies for prizewinning results! Create patch panels that fit  
flush. Repair permanently with lead kits. Refinish stainless/  
aluminum trim with polishing kits. How-to books available.  
Catalog \$1.00 (refundable). Eastwood, 15 Waterloo, Box  
524PM, Berwyn, Pennsylvania 19312.

**NEW** "Quick Oil Change" pump. Drains oil through dipstick  
hole in minutes. Powered from 12V battery. Two year warrant-  
ty. \$27.95. Dapper, Box 1753(PM), Laurinburg, North Carolina  
28352. Free.

**OUTSTANDING TRAVEL GIFTS for YOURSELF and  
OTHERS, HULL DEPENDABLE COMPASSES and HULL  
Comfort-Zone THERMOMETERS.** The Most Useful Driving  
Instruments for Car, Truck, RV. Send for **FREE LITERA-  
TURE, Today!** TRAVELLER GIFTS, P.O. Box 271, Warren,  
Ohio 44482

**ALTERNATOR** Output Improvement 20%- 30%. Harness  
Normally Wasted Power. Simply Attach "ELECTRONIC  
EFFICIENCY MODULE". \$69.95, \$3.00 Shipping. D. D.  
Engineering, Dept. 113, 426 E. North St., Waukesha,  
Wisconsin 53186

**HEADLIGHT COVERS ARE NOT ALL EQUAL!** Ours has  
rubber frame, hidden Attachment, patent pending design.  
Compare first. Free brochure for your car model. Extang  
Corporation, 4451A Ford Road, Ann Arbor, MI 48105. (313)  
665-5270.

**PARTS:** Army Jeep and truck parts. Spare Parts &  
Equipment Co., P.O. Box 751, Lexington, Kentucky  
40501-0751

## MOBILE HOMES

**BARGAIN RIGS ARE AROUND** — if you know what to look  
for, and where. Here are 25 check points to look for in a used  
RV. Photocopy is available Send for Plan R S 84 - \$1.00 to:  
Popular Mechanics, Box 1014, Radio City Station, New York,  
NY 10101

## MOTORCYCLES, MOTORSCOOTERS & SUPPLIES

**GO KART, MINI-BIKE, MOTORBIKE PARTS.** Tires,  
Clutches, Motors and Complete Carts and Mini-Bikes at Dis-  
count Prices. 3 1/2 Hp. motors \$106, 5 Hp. \$130. Send \$1.00 for  
Booklet. Northern Hydraulics, P.O. Box 1219, Dept. 90A03,  
Burnsville, MN 55337

**NEW! ADJUSTABLE RATCHET "GEM WRENCH"**, Sin-  
gle tool does the work of 35 sockets and wrenches. Ideal for  
motorcycles, bicycles, automobiles. Send for free details plus  
catalog. RFD Enterprises, PM10, 2320 Southwood, Dallas,  
Texas 75224.

**GO KARTS, Minibikes, ATV's, And Kits, Parts, Engines.**  
Lowest Prices. 56 Page Catalog \$2.00 Refundable. Kart  
World, Dept C, 1488 Mentor Ave., Painesville, Ohio 44077

## AVIATION, HANG GLIDING

**CHOPPY** ultralight single seat helicopter. Simplified con-  
struction motorcycle engine. Informations \$3.00. Polynova,  
Box 670 'M', St. Remi, Quebec, Canada J0L 2L0

**DESIGN** Build Airplanes, Hang Gliders, Simplified Publica-  
tions. Brochure 20¢. McCoy Aircraft, 12820 S. Figueroa, Los  
Angeles, CA 90061.

**BUILD** The "Petit" Breezy Ultralight Plans \$15.00. Petit,  
2450 N. 56th, Mesa, AZ 85205

(Continued on next page)



## AVIATION, HANG GLIDING

(Continued from preceding page)

**GYROCOPTER**, Hovercraft, Ultralight, Aeroplane, Land-sailer Airboat. Build your own, send \$10.00 Money order for 3-View Drawings, Performance Data, Tools and Time Required to Build, Etc. Homebuilt Aircraft Supplies, 7932 Ontario Street, Omaha, NE 68124

**PROPELLER** Carving Machine. Build it yourself from wood and common hardware. No welding or machining. Plans and instructions \$15. Kite, 4637 W. Northview, Glendale, AZ 85301.

**63 ULTRALIGHT AIRCRAFT PLANS!** Illustrated Catalog \$5.00. Aerofun-M, Salda, CA 95368

## SPACE & ASTRONAUTS

**ANTIGRAVITY** Propulsion Device! Free Brochure. RDA, Box 873NM, Concord, NC 28025

**BOOMERANGS—INCREDIBLE RETURNS!** You can do it. Exciting sport! Order **FREE CATALOG** today. BoomerangMan, 306 Park, Monroe, LA 71201

**SPACE SHUTTLES**, Fantastic Models that Work like Real Thing! For Details Send \$5.00 (Refundable) To: Vannasa, 1115 Castle Dr., Glenview, IL 60025

## HOVERCRAFT

**HOVERCRAFT** Plan All Sizes. Catalog \$1.00, Universal Hovercraft, Box 281, Cordova, Illinois 61242

**AERO-CAR** Amazing Hovercraft built easily with ordinary tools. Lawnmower engine power. Carries one man plus. Hovers, flies forward, backward. Sideways over land/snow/water. Complete construction plans and brochure. \$9.95. Aero-Projects, Box 5118PM, Clinton, New Jersey 08809.

## CB'S, RADIO & HAM EQUIPMENT

**LINEARS**, Send \$1.00 Refundable, Matco Electronics, Box 316C, Cadillac, MI 49601

**CB RADIO** Books, Kits, Modifications, Catalog \$1.00 Refundable. APS, POB 263, Newport, RI 02840

**POLICE** Scanners, Bearcat, Regency, HPR, Box 19224, Denver, CO 80219.

**CB MODIFICATIONS**, Conversions, Books, Plans, Kits. Catalog \$2. CBCI, Box 31500M, Phoenix, AZ 85048

## ELECTRONICS

**GOVERNMENT** Surplus receivers, transmitters, sniperscopes, parts. Catalog 25c. Meshna, Nahant, Mass. 01908.

**BUILD YOUR OWN** Telephone Accessories. Explicit Illustrated Handbook \$10.00. Sound Advice, P.O. Box 14695, Phoenix, AZ 85019

**LATEST** Electronic Bugging detectors. Literature, \$1.00. Clifton, Box 220M, Miami, Florida 33168

## COMPUTERS & SOFTWARE

**FREE** Times/VIC-20/T199-4A/Commodore-64 programs! SASE/catalogs. Inexpensive! EZRAEZRA, Box 5222-M, San Diego, California 92105.

**COMPUTER/Hobby** Table from one plywood sheet. Portable. Versatile. Plans \$5.00. Dukas, 130 Coalbridge Circle, Cary, NC 27511

**TRS-80 COMPUTER DISCOUNTS**. Lowest prices anywhere. Free price list. Radio Shack, 175B N. Delsea Dr., Vineland, NJ 08360. 800-257-0428.

**KILL VIDEO BOREDOM** buy - sell - trade all Atari - Intellivision Colecovision games and cartridges. Send for **FREE** list. Video Marketplace, P.O. Box 2426P, Yakima, WA 98907

**UNDERSTAND YOUR COMPUTER** Friendship is based on understanding. The computer can be your best friend. How-to book plus CP/M Simplified. \$20.00. P.J. Fox, Box 5181, Balboa Island, CA 92662

**TI-99/4A** owners. Send for free list of new and exciting, low cost software. Dynamic, Box 124, Hicksville, N.Y. 11801

**FREE** VIC-20, C-64 Catalog. **LIGHTHOUSE SALES**, Dept. B, P.O. Box 68, Trenton, MI 48183

**PERIPHERY** For The User; Free Brochure, 1455 North Sandberg Terrace, Chicago, 60610

**TIMEX/SINCLAIR** Owners get New Program Listing and Catalog. Send \$1.00: JPR Software, Box 4155, Winter Park, FL 32783

## STEREO, CASSETTE TAPES, ETC.

**RECORD-TAPES!** Discounts to 73%; all labels; no purchase obligations; newsletters; discount dividend certificates; 100% guarantees. Free details. Discount Music Club, 650 Main St., P.O. Box 2000, Dept 1-1083, New Rochelle, New York 10801.

## TV & VIDEO EQUIPMENT

**NOTE: USE OF CERTAIN ITEMS IN THIS CLASSIFICATION REQUIRES STATION AUTHORIZATION.**

**NEW** Electronic TV Antenna Brings in Every Channel Sharp and Clear. Free Information. Send Stamped Envelope. USA Only. ASH, #314PM, P.O. Box 311, Bronx, NY 10456

**VIDEO MOVIES**. Everything imaginable! Bargains! Catalog \$1.00. Tower, Dunkirk, MD 20754-0213

**GIANT SCREEN OSCILLOSCOPE** converted from ANY size TV. Technicians, Hams, Broadcasters, Hobbyists; Minor inexpensive changes convert TV to super-sensitive testing device. No experience needed. Follow clear-cut plans. Fully illustrated. Perfect for Workshop, Lab, School, Etc. ANY size screen . . . ANY size TV complete plans . . . \$5. (plus \$1. Postage & Handling). MicroTech, Dept. GP-02, Box 8561, Waco, Texas 76714

**SATELLITE TELEVISION ANTENNAS** complete detailed plans for home construction by anyone \$5.00. Jansen Electronics, P.O. Box 168M, Dundee, Ore. 97115

**MICROWAVE TELEVISION** "Downconverter" Kits. Catalogue: \$2.00. (Refundable). NDSCO, Box 12652, Dallas, Texas 75225

## BOATS, OUTBOARDS, TRAILERS, & KITS

**BOATKITS - PLANS - PATTERNS - FRAMEPACS - LARGEST CATALOG** - 300 Designs 8' - 80' - Plywood - Fiberglass - Steel - Strip Planking - **POWERBOATS** - Inboards - Outboards - Cruisers - Sportfishers - Hydroplanes - Runabouts (**KAYAKS CANOES** - Large Selection - Plywood - Fiberglass) - **SAILBOATS** - Daysailers - Trailersailers - Multihulls - **FIBERGLASS MATERIALS** - Cloth - Resins - Foam - **CATALOG \$2.00** - "Includes **FREE** Materials Brochure - Equipment - Rigging - (Book "**AMATEUR BOATBUILDING**" - Fiberglass - Plywood - Wood-Epoxy - \$6.00). **CLARKCRAFT**, 16P Aqualane, Tonawanda, NY 14150

**PONTOON** and Houseboat kits from \$1,994.00, Information \$1.00. 1-800-522-1500 ext. 6042. Watercraft, Box 902, Columbia, TN 38401

**EVINRUDE** 1982 Bargains . . . all sizes . . . Scott McCulloch parts . . . \$2. handling . . . Electra Marine, 610 Merrick Road, Lynbrook, New York 11563

**FIBERGLASS - RESINS** - Foams - cloth - epoxies - mat - etc. Factory prices - **CATALOGUE \$1.00** - (Book "**COMPLETE FIBERGLASSING**" \$6.00) - Clarkcraft, 16-Pi Aqualane, Tonawanda, NY 14150

**BOAT KITS** - 27 trailerable models - **POWER and SAIL** - 8'-30'. Molded fiberglass hulls and decks come factory assembled - you install factory supplied interior. Save half factory-built cost. No experience required. 48-page catalog - \$1.00. Luger, Dept. BC-83, 3800 West Highway 13, Burnsville, Minnesota 55337. 612-890-3000

**NOW! TRIM AND TILT KITS FOR ALL OUTBOARD MOTORS. SIMPLE INSTALLATION NON-ELECTRIC. DOLE FLUID POWER. BOX 1987, HUTCHINSON, KANSAS 67501. 316-663-8361**

**TRAILER KITS** - Build Your Motorcycle, Threewheeler or Utility Trailer From A Kit And Save. Dealer Inquiries Invited. Send \$2.00 For Booklet. L&S Distributors, P.O. Box 1381, Dept. PM-10, Albany, Georgia 31702-1381

**PROPELLERS** - For Small Airboats, Balloon Inflators. Universal Propellers, 1805 Milam, Fort Worth, Texas 76112. 817-535-3688.

**PIROGUE** Plans and Photocopies \$8. A.J. Theriot, 3226 Halifax, Baton Rouge, LA 70814

**BOAT PLANS - FRAME KITS - PATTERNS** - Hundreds of designs - Wood - Fiberglass - Steel - Sailboats - Powerboats - Outboards - Canoes - Kayaks - Rowboats - Duckboats - Dories - Houseboats. Proven methods include instructions especially for amateurs. Professional results! No Lofting! "Supplies" - Fasteners - Fiberglass - Resins - Glues - Books. Send \$2.00 for Huge 144-page catalog or \$4.00 Airmail. Includes Free "Boatbuilding Supplies" brochure. Investigate our "Poxy-Shield"/"Poxy-Grip" wood epoxy boatbuilding system - Manual - \$2.00. **GLEN-L MARINE**, 9152 Rosecrans, Box 756MP, Bellflower, CA 90706.

**BOATBUILDER'S PLANS**, Patterns - Kayaks, Canoes, Sailboats, Pirogues, Fishing Boats, Duckboats, 40 models. Catalog 25c. Outdoor Sports, Box 871C, Brentwood, TN 37027

**AMATEUR BOATBUILDERS!** Building a Boat? Considering it? Send for **FREE** Brochure: **INTERNATIONAL ASSOCIATION OF AMATEUR BOATBUILDERS**, Dept. P.M., P.O. Box 1855, Rockville, MD 20850

## ATHLETIC EQUIPMENT AND BODY BUILDING COURSES

**BUILD MUSCLES WHILE BLOWDRYING YOUR HAIR!** Efficient . . . Effective Program. \$3.95. Strathmore, Box 4235 PMO, Madison, WI 53711

**BIGGER**, More Powerful Muscles - faster!! Free Booklet! Universal, Box 6894A, Detroit, Michigan 48240

**BUILD MASSIVE MUSCLES!** Free Packet! Mus-L-Up, Box 1816X, Fontana, CA 92335

**KUNG-FU** Free Lessons. Send \$1.00 for Postage. McLisa, Box 1755, Dept. PM83J, Honolulu, Hawaii 96806

## FISHING, TACKLE, LURES

**NEW JIGMATE** Fish Lures. Cut Line, Sharpen Hook Or Knife, Four Jigmate Hooks. \$4.50 Dealers Welcome. Jigmate, 431 N. Gray Street, Brookhaven, PA. 19015

## GUNS, DECOYS, HUNTING

**SCHRADE** Bear Paw: 3 1/2" locking blade; leather belt pouch. List \$37.95. \$24.00 postpaid. Write for discount knife catalog. The Wilderness Edge, D-PM10, RFD#4 Box 121, Canton, N.Y. 13617.

## BATTERIES, GENERATORS

**SENTRY** Generators With/Without engine. Big discount. JJ Enterprises, Box 593, Oshkosh, WI 54902

## BATTERY REBUILDING SCHOOL

**BATTERY** Rebuilding Tools, Instructions \$326.00. Manual \$65.00. Training Available. Sun Battery, 10415 98, Sebring, Florida 33870

## ENGINES, MOTORS

**STEAM ENGINE** and **MACHINE TOOL CASTINGS** Model Engineering Supplies, Catalog \$3.00 Refundable With Order. D & M Model Engineering, Box 400, Dept. 110, Western Springs, IL 60558

**AC MOTOR** 1 1/2 volts, 5800 RPM. Easily powered by photo cell or AC battery. \$3.25. Sun-Co Solar Corp., PO Box 120, Theodosia, MO. 65761. 417-273-4927

## TOOLS FOR SALE

**DISCOUNT TOOL** Catalogue - \$1.00. Hoosier Distributing, 3009 Sample, South Bend, Indiana 46619

**TOOLS-Wholesale Prices!** Buy or Sell Name Brands! Free Catalog or Dealer Info. (Specify). Mr. Tool Wholesalers, Star Route 233U, Albrightsville, PA 18210

**WHOLESALE PRICES** Without Hassle . . . **QUALITY** tools, knives, gifts, jewelry. Single quantities. Free Catalog. Beveridge Enterprises, 5618 Tremont, Alexandria, VA 22303

## UPHOLSTERY SEWING MACHINES

**UPHOLSTERY** Sewing Machines with Walking Feet, complete ready to use - only \$489.00. Thompson Model PW103-AGBP AVAILABLE FROM YOUR LOCAL DEALER, or order direct. (Master Charge-Visa). Datto Mig., Inc., P.O. Box 12110, Lubbock, Texas 79452—Phone: (806) 744-6774

## MACHINERY, TOOLS & SUPPLIES

**SILVO** Hardware, 188 page Hand & Power Tool Catalog \$1.00, Dept PM3-10, 2205 Richmond St., Philadelphia, PA 19125

**SMALL FOUNDRY** Furnaces, Supplies. Free literature. Pyramid Products, 3736 South 7th Avenue, Phoenix, Arizona 85041

**4" METAL** Cutting Lathe \$83.50. Taig, 15048 Proctor, Industry, CA 91746

**1400** Catalogs Listed and Described. Sources for Everything Imaginable. \$4.00. Masterlog, Box 879-B, Fairfax, CA 94930.

**SCREW** machine, steel, brass, aluminum, bars. Catalog: \$1.00. **METAL BY MAIL**, 3719 N. Fremont, Chicago, Illinois 60613.

**BRASS**, Steel, Aluminum, Stainless, Acrylic, Nylon, Teflon. No minimum. Catalog \$1.00 (Refundable). **METALS**, Box 11204, Clayton, MO 63105

(Continued on next page)  
Material supplied by various sources



## MACHINERY, TOOLS & SUPPLIES

(Continued from preceding page)

**STEEL**, Aluminum, Brass—Sheet, Bar, Shop Supplies. Plans. Write: CEI, RR1, Box 163, Cameron, IL 61423.

**WOODCARVERS** Supply. 3056 Excelsior Blvd., Minneapolis, MN. 55416 - 90 Page Catalog \$2.00. Free with order of Sheffield Steel Bradawl \$4.00.

**BOLTS**, Nuts, Screws. **WHOLESALE**, Direct. Guaranteed. Free Catalog. Camelot, Dept. 44, Box 65, Bristol, Wisconsin 53104

**CHRISTMAS MACHINERY SPECIALS**. **BAND SAW BLADES** Any Size **IMPORTED** H.D. Commercial Wood and Metal Working Machinery. 10" Contractors Saw \$450.00, 14" Bandsaw \$370.00. Free Information, **SUFFOLK MACHINERY**, 16 Shore Road, Patchogue, NY 11772

**LATHES**—Unimat—Maximat—Sherline Enco. Catalog \$1.00. Shop Supplies \$1.00. Campbell, 21000 Selma Road, Springfield, OH 45505. (513) 322-8562.

**CATALOG METAL AND HARDWARE** \$2.00 Refunded with First Order. Brass, Copper, Stainless Steel, Aluminum and Steel. All Shapes and Sizes. Bolts, Nuts, Rivets, Screws, Bearings, Sprockets, Bushings, etc. TWF Industries, 102 South First Street, Barrett, MN 56311

## BLACKSMITH SUPPLIES

**FORGES**: gas, coal — hammers — tongs — anvils — anvil benches—all blacksmith supplies. Catalog \$2.00 (refunded first order) Mankel Blacksmith Shop, 7836 Cannonsburg, Cannonsburg, MI 49317.

## ENERGY SAVING

**LITE-SAVER**® Inexpensive micro-chip extends light bulb life to 100 times. Saves energy. Free details. SRC, Box 118A, Suite 210, Lorna Square, Birmingham, AL 35216

**199 Ways To Cut Your Utility Bills Now**. \$3.50. Burlington Press, Box 353, Burlington, IL 60109

**HIGH ENERGY BILLS?** Save To \$200 Yearly with Laboratory Tested Unit For Hot Water Heater. \$12.95. Charlie Skinner, Rt. 1, Box 208, Islandton, S.C. 29929

**REDUCE OUTRAGEOUS ELECTRIC BILLS!** Arthur Enterprises, 45-10 Utopia Pkwy., Flushing, NY 11358

**SOLAR CELLS**. 4" Diameter **CRACKED** — 10 for \$40.00. E.J. Sales, P.O. Box 3084, Centerline, Mich. 48015

**EVAPORATIVE AIR CONDITIONER OWNERS** Revolutionary new way to winterize Evaporative Air Conditioners. No more poor fitting and bulky A/C covers. Minimizes dust, lengthens cooler and cooler pad life. Energy saving and easy to install. One set fits most standard residential Evaporative coolers. Mail \$15.95 per set, check or money order to: E.M.T. Ltd., P.O. Box 8554, Dept. H, Amarillo, Texas 79114

**ENERGY BILLS TOO HIGH?** Here is an Information Package Containing 25 Ways to Cut Home Energy Costs Without Making ANY Major Investments. Send \$3.00 to: L. A. Weatherford, Box 9276, Hanahan, S.C. 29410.

**REDUCE HEATING COSTS 48%** Send Stamped Self-addressed Envelope to: Energy Conservation Products, 2530 Main, Parsons, Kansas 67357

## SOLAR & ALTERNATE ENERGY

**SOLAR AND ENERGY SAVING PRODUCTS CATALOG!** **MATERIALS**: Components; Complete System. 80 Pages, 18 Sections. Our 10th year! Order from one expert source—the country's largest energy saving mail order house! Call us at 603-668-8186 or send \$1.00 ppd. **SOLAR COMPONENTS CORPORATION**, Dept. M, P.O. Box 237, Manchester, NH 03105

**SUN TRACKING SOLAR COLLECTORS** Worlds most efficient Sales Franchises Available. Brochure \$2.00. Ross Solar Systems, Medina, Washington 98039

**SOLAR POOL HEATER!** One day DIY installation. Commonly available inexpensive materials. Swim year-round. Plans \$9.95. Shelran, Box 8305, Coral Springs, Fla. 33065.

**SAVE** easy to build long lasting forced air fireplace insert for less than \$100 using ordinary hand tools. Send \$10 for plans To: J. Polovick Co., 5800, San Juan Ave, Citrus Heights, CA. 95610

## HEATING, FUEL SAVERS

**FURNACE HEAT COLLECTOR**, saves 25-55% on residential or commercial gas, wood or oil bills. Plans - \$5.00. Guaranteed. AVTRAX, Box 144B, Lebanon, Georgia, 30146.

**WOOD BURNING CIRCULATING SYSTEM**, World's Most Efficient. Heats/Cools. Simple adaptable designs for insert and freestanding. Patent Pending. Plans \$5.00. Circulator, 1215 N. Edison, Stockton, California. 95203

**SAVE \$\$\$s ON FUEL COSTS** — D.D. King Wood-Burning Furnaces give complete central heat. Safe. Easily installed. Call or write for **FREE BROCHURES**. Davison Manufacturing Co. Box 277, Marshall, Arkansas 72650. Phone (501) 448-3647.

**SAVE MONEY - SAVE ENERGY** - Gas Water Heating Attachment Saves 20%-40%... New... Easy... Warranted! Free Information: Perry Marketing, Box 303-PM10, New York, N.Y. 10021

**FIREWOOD** from **SAWDUST** Easy Formula \$10.00. Today's Ideas, Box 22304-O, San Francisco, CA. 94122

**OIL BURNER CLEAN OUT** Easy Step By Step Instructional Guide C.O.D. \$4.95. C.B.D. \$3.95, Plus \$2.00 Handling and Mailing. Oil Fire, Maybrook, New York 12543

## HOME CRAFTSMAN

**MAKE GIFTS NOW!** Enjoy Creating Profitable Wooden Children's Items. Housewares. Unique Gifts. Brochure **PLUS** Sample Pattern. Only \$1.00. Accents (G-103), Box 262, Danvers, MA 01923

**TOYMAKING** for fun, profit! Illustrated ideas! Patterns, supplies, wheels! Information free. Morgan, PO1801, 1123 Bardstown, Louisville, Kentucky 40204.

**WOODEN** Wheels Plans Kits \$3.50 For Booklet, Full Page Toy Photos Refund with First Order. Whimsical Woodcraft, P.O. Box 81, Puslinch, Ontario, M0B 2J0

**LOWEST** Prices on Furniture, Craft, And Toy Parts. Send \$1.00. K&K Woodcrafters, RD4, Box 270A, Scotia, NY 12302

**FREE CATALOG** Tools, supplies for crafts, hobbies, wood-working, jewelry, stained glass, Foreman, Dremel, Maxon, etc. **DISCOUNT PRICES**. Write: Bargain Book, Box 215, Helendale, CA 92342

**PLANS** for nylon fishing line weed cutter. My cost was \$2.00 using items from neighbor's junk. Send \$5.00 to: Beck, 716 Westwood, Port Lavaca, Texas 77979.

**LEARN TOY SOLDIER CASTING**. Fun-Easy-Profitable. Illustrated Book Plus Mold Catalog \$2.00. Durken's, Calvert, Texas 77837

**UNFINISHED** picture frame moulding. Factory closeout. 50% discount. 200 styles. Write: Japs, 126-PF Seventh North, Hopkins, MN 55343

**MAKE TOYS** - Plans, Kits - Hardwood Wheels, Parts, Dolls - Catalog \$1.00- Cherry Tree Toys, Belmont, Ohio 43718.

**WOODEN** Toys Are Better. List Of Plans \$1.00 U.S. Currency Only. Woodbutchers Toys, Box 514, Leslie, Mich. 49251

**WORLD'S LARGEST CATALOG?** Three pounds 704 pages. Every Tool, Supply, Machine Imaginable \$5.00. Refundable. McKilligan, PM-1083, Johnson City, New York 13790

**WALNUT** Lumber cabinet grade. Squares, Gunstock blanks, Veneer. Iowa-Missouri Walnut Co., Dept. M, Station A, Box 66, St. Joseph, MO 64503

**FLYING TOYS**, Five Plans, \$5. Janus, 2516 N.E. 168th, Seattle, WA 98155

**FAVORITE WOOD TOYS**, Patterns, Parts, Wheels. Catalog \$1. Toys And Joys, Box 628M, Lynden, Wash. 98264

**PLANS: HEIRLOOM WOOD TOYS** 35¢ for info. refundable. Uncle Ray's Workshop, 4056 So. 146th, Seattle, WA. 98168

**WOODCRAFT PATTERNS**, Windmills, Wishing Wells, Bird Houses, Feeders, Flying Duck, Pheasant, Outdoor Planters, Catalog \$1.00. Crafters, 11840 US. 27 North, DeWitt, Michigan 48820.

**CATALOG FULL-SIZE FURNITURE PLANS** — \$2.00. Refunded with first order. Traditional, Early American, over 170! Furniture Designs, 1425 Sherman, Dept. CP-83, Evanston, Illinois 60201.

**SANDERS, ROUTERS, JIGSAWS, PLANERS, RYOBI** world's largest Diecaster. **SPECIAL** - One HP plunge router \$88 ppd. Free catalog add \$1 postage. Master Craftsman, Dept 1003, Box 307, Xenia, Ohio 45385.

**ANTIQUING SECRETS** "Profitable" **PLUS** Great **COUNTRY PATTERNS** Rooster, Horse, Pig, Shorebird on Stands. \$5.00. Country Sculptures, 14 Tamarack, Mahopac, New York 10541.

**30 WOODEN TOY PATTERNS** - Sturdy Favorites - Cars, Trucks, Trailers, Train, Airplanes - \$5.00 - **FRANKS**, 1202-P12 Second, Booneville, MS 38829

**JIG SAW OWNERS**. Make unique wooden micro puzzles. 20 patterns \$5.00. Kinetic Wood, Box 12, Beachy Cove Road, Portugal Cove, Newfoundland, Canada A0A 3K0

**KIENZLE** Battery Clock Movements (Quartz) and accessories. Free price list. North American, Box 77-AKK, Fox River Grove, Illinois 60021.

**WOODEN PATTERNS**- Catalog of over 50 available plans and building instructions for wood toys, furniture, antiques, and more. Send \$1.00 (refundable). J.J. Enterprises, P.O. Box 19658, Rochester, NY 14619

**PRECISION CUTTING** all angles, with your circular saw. Build easily, under \$10.00 in an hour. Carry anywhere. Plans \$6.00. Pyasaw, 10221 Slater Avenue, Suite 103, Fountain Valley, Calif. 92708

**WOODWORKERS** Quick Easy Projects. Denny's Woodshop, 304PM Brian, Mt. Horeb, WI 53572

**FLOATING** Residential Dock? **PLANS** with "How-To" Book. **FREE** Brochure. ADSCO, Department C-10, Savannah, Georgia, 31414-5772

**BRANDING IRONS** Brand your Name on Wood. Free information. Nova, Box 29341J, Lincoln, NE 68529

**GRAMPA'S BIRDHOUSES**— Eighteen Award Winning Plans! Apartments. Too! \$6.00. Woodartist, Box 31564-P10, Charleston, SC 29417-1564

**GEODESIC DOME ANIMAL HOME**— Excellent, maximum space shelter for rabbits, etc. Fun, easy. Learn about domes by building one! Plans \$10. **GILLIES**, P.O. Box 330, Bath, Maine 04530.

**WOODEN TOY TRAIN**. Five cars, easily expanded. Plans plus wheels, smokestack, \$8.00. Plans only, \$4.00. Taylor, Dept. PM103, 4949 West Saint Charles, Lake Charles, LA. 70605

**POKER** Table Plans \$4.00. Traditions, 3080-P Oaklane, Stevensville, MI 49127

**WOODEN TOY PATTERNS!** Forty Easy Patterns For Fun or Profit. Just \$5.00! Kelly's Korner, Box 11287, Raleigh, North Carolina 27604

**FLYING TOYS**, five different flyers. Plans \$5. Janus, 2516 N.E. 168th, Seattle, WA 98155.

**LEVEL** Make \$0 Footer Under \$10.00. Cheap, Easy, Perfection. Send \$3.00. 330B, Imperial, PA 15126

**MAKE** Wooden Cradles, Wheelbarrows, Birdfeeders, Racecars. Easy-Profitable. List Of Plans-\$1.00. (Refundable). Keepsakes, Box 18733, Shreveport, LA 71138

**YOUTH BED** plans using present crib mattress. Has side rails, shelved headboard for toys. Only \$5.00. Stillwater Woodworks, Box 137M, Ludlow Falls, Ohio 45339.

**BOSTON ROCKER KIT** Oak. Free Catalog. Woodshed, 520 Cedar, Centralia, Ill 62801.

**PROJECT PLANS** by Licensed Architect. Free details. Midland Mail, 103 Godwin Ave., Midland Park, NJ 07432

**HANDCRAFTED TOYS MAKE MONEY**. Original, market tested patterns. Catalog \$1.00. Refundable. Marco, Box 814584M, Dallas, TX 75381

**YOU CAN BUILD** Furniture, Toys, Accessories and Shop Equipment. Free Free Plans with Illustrated Catalog 700 Items. Send \$1.00 for Details. Mayco Sales, Box 2931PM, Mesa, Arizona 85204

**LEAD** Soldier Molds. Scarce Civil, WW1, Cannons, Fantasy. Illustrations. Brochure \$1.00 (Refundable). Durken's, Calvert, Texas 77837

**LIQUIDWOOD & WOODPOX RESTORE** ROTTED, DETERIORATED **WOOD** to new life: fill holes, cracks; replace missing wood permanently. Literature \$2.00 refundable. Abaton, 141 Center Dr., Dept. PM, Gilberts, IL 60138.

**BATTERY CLOCK MOVEMENTS**. Below wholesale prices. Best Quality Catalog \$1.00 (refundable). Yankee, Box 26, Thompson, Connecticut 06277

**PLANS**: Multi-size furniture; Details: 25¢. Flexiplan-KK, 48 Lowell, Westwood, NJ 07675

## WOOD, WOODWORKING

**VISECLAMP** 1 1/2" Opening 3 1/2" Jaws, \$29.90. Box 3385, Oak Park, IL 60303

**WOOD GLOW** This book holds the secret of wood finishing. Release the hidden natural gem like luster of each wood. Wood finished this way reflects light in a way not possible when using conventional finishing materials. \$6.75 Postage & Handling \$1.25. **RAAB-KIRK CO.**, P.O. Box 208, Corvallis, Oregon 97339

## PLANS, BLUEPRINTS, PROJECTS

**LOW** cost homes you can build, booklet of plans \$1.00 refundable. Panama Products, Box 9626, Jacksonville, Florida 32208



## FOR THE HOME

**DON'T BUY CARPET** Until you Read "CARPET WISE" Information on how and what to Buy, Measure and Save Money. Illustrated \$3.95 Postpaid. R&L Enterprises, 504SW17, Richmond, Ind. 47374

**BUTCHER BLOCK KITCHEN TABLE.** Build this old-time chopping block for your home. Photocopy of plans available. Send for Plan X-674-A + \$1.25 to: **POPULAR MECHANICS**, Box 1014, Radio City Station, New York, NY 10101

## HOME BUILDING & REMODELING

**SWIMMING** Pool Equipment Parts Purex Starite A.O. Smith Jacuzzi Bros. Send Model Numbers + \$2.00 For Complete Parts List And Prices. Cal MFG., 31200 LaBaya Drive, #305, Westlake Village, CA. 91362

**HOW** Much Home Can You Afford, Guidelines \$2.95, Woodell Enterprises, Box 243, Olathe, Kansas 66061

## PLASTICS

**CASTOLITE** Liquid Plastics. Crystal clear, colors. For casting, embedding, coating, fiberglassing, in industry, laboratories, craft work. Reproduce your designs with our mold materials. Catalog \$1.00. **CASTOLITE**, Dept. 83M PM, Box 391, Woodstock, IL 60098.

## DO IT YOURSELF

**POOR MAN'S CATALOG.** U-build power tools, lathes, sanders, engraving machine, energy savers, crafts, toys, much more. \$3. L.C.D. Enterprises, Box 1141, Fond du Lac, WI 54935

**HOME** Repair Guide. \$6.55. Rosebud, 1305B Caravel Street, Carritos, CA 90701

**RADIO CONTROL** your self-propelled Lawnmower. Mow Lawn from porch. Plans \$11.95. Info. \$1.00. R.C. Mowers, Brookside, AL. 35038-0083

**ELECTROPLATING.** Complete amateur's textbook. All metals Electroplate metallic/nonmetallic items \$11.95. Details free. Tropic, Box 95-P3, Palm Bay, Florida 32905.

**SAVE** on parts for Lawnmowers, minibikes, Karts, Chainsaws, Small Engines. **THOUSANDS OF PARTS.** Send \$3.00 For Catalog. Saw-On-Parts, P.O. Box 231, Somerville, Mass. 02145

**WATERBEDS!** Plan And Accessory Catalogue \$1.00. Waterbeds, 1210A "Z" Street, Vancouver, Washington 98681

**UPHOLSTERING SUPPLIES** \$1.00 for Prices. Variety Products, Box 568P, Lathrup Village, Mich. 48076-0566

**1400** Catalogs Listed and Described. Sources for Everything Imaginable \$4.00. Masterlog, Box 879-F, Fairfax, CA 94930.

**HOW** To Build Backyard Shelterhouse—Inexpensive recreation and storage under one roof! Free information — Shelterhouse, Box 30PM2, Millbury, OH 43447-0030

**AUTOMATIC POWER FAILURE LIGHT.** Brochure. \$1.00. Sunco Electronics, Dept. 6T, Hialeah, FL 33016

**LOCKSMITHING** Kits, Tools, Training. Details. **RALCO**, Box 16434M1, Memphis, TN 38116

**PROJECTION TV** . . . Convert your TV to project 7 Foot picture . . . Results comparable to \$2,500 projectors . . . Total Cost less than \$30.00 . . . **PLANS & LENS** \$19.95 . . . Illustrated information **FREE**. Macrocoma-BB, Washington Crossing, Pennsylvania 18977. Creditcard orders 24 Hrs. (215) 736-3979.

**WATERFALL** Self Contained Easy 3 Hour Non-permanent No Concrete Construction. Send \$5.00 For Diagram & Instructions. L. Keegan, 116 Gray, Billerica, Mass. 01821

**HARDWOOD FLOOR** 3/4" x 2 1/4" solid oak select \$1.99. Katzir's Floors. (213) 990-7340.

**WOODGRAIN STEEL DOORS** - Experience the easy and realistic woodgrain beauty with the Old Masters Woodgraining Kit. Information write: Master Products, Box 274PM, Orange City, IA 51041.

**GARAGE**-Basement Work Table. Folds Down. Self Storing. Extra Strong. Plans-Material List \$4.00. Rush Planning. 3731 South Glenstone, Box 197, Springfield, Missouri 65804

**MAKE LUMBER** with your Chain Saw with the Boyce Lumber-Mill. Inexpensive, Efficient — Boyce Industries, 408 South Chester, Gastonia, NC 28052

**BUILD** Your Own Storage Building, **EASY-IN DOOR RAMP**. Complete Illustrations \$3.00. Buildings, Box 6, Gibson, Tenn. 38338

**HYDRAULIC LOG SPLITTER PLANS.** Exerts 10,000 lb. pressure. Powered by 3-hp gas engine. Send for Plan PL-1708 + \$8.95 to: **POPULAR MECHANICS**, Box 1014, Radio City Sta., New York, N.Y. 10101

**WOODEN HOBBY HORSE** Plans \$10.00. P.O. Box 8856, New Orleans, LA 70182

**HOTTUB** Build Yours For Under \$1000. Send \$9.95 For Plans. Box 893, Bridge City, Texas 77611

**BUNK BEDS** and **KIDS CLUB HOUSE SWING SET** Both Plans \$5.00. W & W Improvements, 910 Orange Street, Cashion, Ohio 43812

**LEARN** Which Glue To Use, For Proper Adhesion . . . Booklet \$3.00 . . . J. Harris, Box 219, Red Wing, Minn. 55066

**PROJECTION TELEVISION IN YOUR HOME UNDER \$25!!!** Convert your television to project **GIANT 7-FOOT PICTURE** . . . **MONEYBACK GUARANTEED** . . . **FREE** recorded information 1-704-692-5574 or for your kit **RUSH** \$19.95 to: Bel-Aire, P.O. Box 430-P2, Mountain Home, North Carolina 28758. Creditcard orders 24Hrs. 1-704-692-5588.

**HAIRCUTTING** Kiddie Cuts at Home. \$3.00 to: Hair Lines, P.O. Box 2633, Cherry Hill, N.J. 08034

**PLUMBING GUIDE**-Illustrated-easy to follow instructions. \$5.00. Hartford House. 4865 Shields, Canfield, Ohio 44406.

**BELT** buckles for coins or stones, specialty buckles, jewelry mountings, cut stones, clock works. Wholesale catalog 25c. Eloixite Corp., 806 1/2 10th Street, Wheatland, Wyoming 82201

**ELECTRIC** Motors Operate Three Phase Motors On Single Phase Current Wiring Diagram Available. Send \$3.50. Davis Machine & Electric, 615 Piner Rd., Wilmington, N.C. 28403

**TELEPHONE OWNERS MANUAL**-Deregulation, Trouble Identification, Testing \$3.50. Hoss, 1020A1 East Los Altos, Fresno, CA 93710

**PYRAMIDS** Any size. Permanent or temporary. Complete plans \$2.00 SASE. Box 18076, Philadelphia, PA 19147

**WIND** Chimes Plans. "Enjoyment or Profit." \$2.00, SASE. G. Brower, Pleasant Valley, NY 12589

**TAG-ALONG TRAILER** Tow vehicles easily. Detailed blueprints. \$5.00. Basic Engineering, Box 7038, Memphis, TN. 38127

**BUILD** Your Own **SATELLITE ANTENNA** From Plywood Ribs And Window Screen. Easy to follow illustrated Plans Include 8' Square Antenna and Base Construction. Listings of Where to Purchase Electronics and how to find Satellites in your area. Send \$11.95 to: RA Enterprises, P.O. Box 983, Grass Valley, CA 95945

**UNIQUE** portable B.B.Q. grill, rotisserie Griddle Plans & Blueprints \$10.00 SASE, M.O. only. BBQ, Box 661, La Grange, Illinois 60525

**POOR** Mans Energy Plans. . . **FREE** Information . . . Send SASE To: Solar Woodwinds, 452 Peninsula, Westwood, CA 96137

**FREE ELECTRICITY** . . . Easy to Rewire Car Alternator for 110 Volts A.C. Use with Wind, Hydro, Gasoline Engine. Free information . . . Waterwheel, Box 735, Northville, Michigan 48167

**HITECH** Materials, Components: Graphite, Kevlar, Alloy Tubing. Purchasing Service. Catalog \$2. **TECHNAPARTS**, B1, Box 2988, Saratoga, CA 95070

**NEW! . . . REPAIR ANY TV . . . EASY.** Anyone can. Write: Publications. RR#3 Box 601B, Colville, WA 99114

**CHAIR CANING SUPPLIES** — Cane Webbing, Rush, Splint, Rawhide, Cord Embossed Seats. Catalog \$1.00. (Refundable). The Caning Shop, 926 Gilman (PM), Berkeley, CA 94710

**BACKYARD PLAYGROUNDS** 25 Plans Under \$50.00 Send \$5.00. Custom Playgrounds, Box 954, Manchester, Conn. 06040

**KITS!** Our catalog lists unbelievable variety of kits; hundreds of sources. \$4.25. Kits, Box 29182A, Greensboro, North Carolina 27429

## REPRODUCTION MOLDS

**LARGE RUBBER MOLDS** For Plaster Animals Send \$5.00 Refundable To: Florida Molds, Box 3488, Jacksonville, FL 32206

## ARTS, CRAFTS, SUPPLIES

**PLASTERCRAFT, CANDLECRAFT, RUBBER MOLDING** For Fun - Profit! Make Figurines from Complete Kits. Catalog - \$2.00 (Refundable). Woolley Company, Box 68K, Peoria, Illinois 61650. Established 1917.

**FREE CATALOG** Tools, supplies for crafts, hobbies, wood-working, jewelry, stained glass. Foredom, Dremel, Maxon, etc. **DISCOUNT PRICES.** Write: Bargain Book, Box 215, Helendale, CA 92342

**"GETTING** Started in Stained Glass" \$1.00. Whittemore, Box 2065T, Hanover, Mass. 02339.

**PRECUT STAINED GLASS** Tiffany style How-to Kits. Catalog \$0.50. Renee's Creative Stained Glass, 1216 Glen Arbor, Los Angeles, CA. 90041

**NEW**, "Artist's Sales Manual," A Guide To Selling Your Arts & Crafts." Send \$5.95 To: Foxworth, Box 37287A, Phoenix, Arizona 85069

**STAINED GLASS SUPPLIES** Complete Catalog \$2.00 (refundable). Sunshine Glassworks, 785 Millersport, Dept. CT, Amherst, NY 14226

**STAINED GLASS SUPPLIES: EXCITING SUPER CATALOG-PM** \$3.00. CORAN-SHOLES INDUSTRIES, 509 E. SECOND, BOSTON, MA 02127.

## CARTOONING, COMMERCIAL ARTS, SIGN PAINTING

**SIGN** Painting — Easy method. Free catalogue. Kaulmann Company, Centertown, Missouri 65023

**CARTOON** For Fun and Money!!! Free booklet!!! Cartoons, Box 40614A, Detroit, Michigan 48240

**35 LESSON** cartooning course. Cartoonist's Magazine, both \$4.00. Hartman, Box 30367, Lincoln, Nebraska 68503-0367

**MODERN** Cartooning taught by mail. Write for free brochure. Cartoonorama—Box 263-3V, Branford, Conn. 06405.

## MODELS, MODELS SUPPLIES

**AMAZING REALISTIC** model boats, radio control. Speeds to 50 mph., fiberglass 31" to 48". Must see to appreciate, new photo catalog \$3.00. Prather Products, 1660 Ravenna, Wilmington, CA. 90744

**FIRING CIVIL WAR** Model **CANNON** Plans: Catalog free. Green—PM-103, Box 892, Shalimar, Fla. 32579

**RADIO CONTROL** Airplanes, Boats, Helicopters, Supplies. Big Discount Catalog \$5.00 (Refundable). Modelers Supply, Box 7185, Montgomery, AL 36107.

**SCALE SHIP MODELS.** Since 1905 our Model Ship Kits and Fittings have been the Favorites of Discriminating Modelers. Send \$2.00 for Big Catalog. **BLUEJACKET SHIPCRAFTERS**, Box 533P, Shelton, CT 06484

## TOYS, GAMES, KITES, PUZZLES, NOVELTIES

**SAVE!** Create Toys-Crafts made from household items. Send \$3.00 SASE to: Flying Shuttle Co., Dept. 1A, P.O. Box 309, Verona, PA 15147

**1001 THINGS YOU CAN GET FREE!** Gameworld, P.O. Box 892, Sharon, PA 16146.

## MAGIC TRICKS, JOKES, VENTRILOQUISM

**PROFESSIONAL Magic!** Huge catalog, over 1,000 tricks and books. \$2.50. Hank Lee's Magic Factory, Dept PM10, 24 Lincoln Street, Boston, Massachusetts 02111

**LEARN VENTRILOQUISM!** Guaranteed Instruction, Supplies, **DUMMIES**. Information Free! Maher, Box 420-PM, Littleton, Colorado 80160.

**FREE!** World's Leading Novelty Catalog. 1600 Jokes, Tricks, Science, Sports, Hobbies. Johnson-Smith, C-6013, Mt. Clemens, MI 48043

## HOBBIES & COLLECTIONS

**MILITARY** Medals Catalogue 50c. Yearly Subscription \$4.50. Vernon, Box 387PM, Baldwin, NY 11510.

**NAZI** war souvenirs. **FREE** illustrated catalog. Delta, Box 31224PS, Honolulu, Hawaii 96820

**TOY SOLDIER MOLDS.** Make military, chess, medieval figures. Profitable - Fun! Free information. Castings, P.O. Box 3482-PM, Longwood, FL 32750.

## DECALS, EMBLEMS, PATCHES

**SAVE** Big. Buy Patches, Decals, Pins & Caps Factory Direct. Free Catalog. Free Pricing. Eastern Emblem Co., Box 828-PM, Union City, N.J. 07087

**CUSTOM** Embroidered Emblems—**FREE** Catalogue. Quotes, Rush Sketch, Stardom, 61 Jane St., New York, NY 10014. 212-988-0009

## ANTIQUES, RELICS, INDIAN GOODS & CURIOS

**FREE** List to Serious Collectors. 30,000 Indian Artifacts, Pots, Spears, Axes, Slate, Beadwork. Caddo Trading, Box 669, Murfreesboro, AR 71958

(Continued on next page)



## ANTIQUES, RELICS, INDIAN GOODS & CURIOS

(Continued from preceding page)

**ARROWHEADS** \$7.50 Doz., Flintwork, Stonework, Rugs, Baskets, Pottery, List 40c. Secrest Antiques, Deerfield, MO 64741

**ANTIQUE GUIDE.** 600 Page Fully Illustrated. \$10.95. **HOUSE OF RICHARD,** 3308 Heather Glen, Mesquite, Texas 75150

## STAMP COLLECTING

**50 YEARS** Old fifteen different United States, over fifty years old—25c with approvals. Jaxon, Box C11-P, New Rochelle, New York 10804

**2,000,000** Stamps - 150 Countries - 2c each. Belden, Box 4149, Dearborn, 48126

**WOW!** 50 All Different Germany-10c! Super collection of genuine German Commemoratives, Definitives, Airmails, High Values. Free Big Catalog. Also fine stamps from our approval service. Buy what you like. Return balance promptly! Send 10c today! Thank you. Jamestown Stamp Co., Dept. A103PM, Jamestown, NY 14701

**FREE** World-Wide packet. Penny approvals. Froehlich, Drawer 968-A, Morton Grove, IL 60053

**95 DIFFERENT U.S.** .25. Cottage Stamps, Box 16, Pelham, N.Y. 10803

**1,000 DIFFERENT WORLD & 100 DIFFERENT MONGOLIAN BEAUTIES** \$2.95. Attractive approvals (pictorials). Cancel service anytime. **ADULTS ONLY.** Gouge, Box 1320-MO, Elizabethton, Tennessee 37643

**\$5.00** Catalogue Value Contains British Commonwealth Foreign 10c Plus Bargain Approvals. City Stamps, Box 216, Station "W", Toronto, Canada M5M 4Z2

**FREE!** Big Bargain Catalog - New Edition listing thousands of bargains including U.S. & B.N.A. stamps, packets, albums, accessories and supplies. Also fine stamps from our approval service. Buy only what you like. Return balance promptly! Thank you. Jamestown Stamp Co., Dept. E103PM, Jamestown, NY 14701

**U.S. BARGAINS! SCARCE OLD STAMPS, SOMEWHAT IMPERFECT. AFFORDABLE, APPEALING, SURPRISINGLY UNCOMMON APPROVALS FOR ADULTS.** RIVERTOWN, Dept. 152, Ada, Michigan 49301.

**FREE** Surprise Collection with approvals. Gould, Box 2130, Petaluma, CA 94953

**GREAT** Gift free with 1st purchase—fine United States approvals and want list service. Send .15c for handling. The Stamp Boutique, P.O. Box 456, Madison, NJ 07940

**BREATHTAKING** Beautiful. 50 Different mint Monaco pictorials commemoratives only \$1.50 with mint complete set approvals. Pagoda, Box 132P, Sidney, Ohio 45365.

**UNITED NATIONS** 3 Complete Mint Sets 25c, Approvals. Cornetta, POB 1509-M, Lake Placid, Florida. 33852

**50 DIFFERENT** Old U.S. between 1861 and 1939 - \$1.00. Ed Roush, 423 Shepard, Mansfield, Ohio 44907.

**OLD U.S.** Stamps on Approval. Chester, Box 15355G, Philadelphia, PA 19111.

**WORLD** Wide Stamps mounted in books on approval 2c and up. **TRUST STAMP COMPANY,** P.O. Box 100-P, Jamaica, N.Y. 11435

**BARGAIN** 100 World-wide Stamps 25c. Quality Approvals. R. Parker, Box 143, West Brookfield, MA 01585

**FREE** 100 Canada with request of World Wide Approvals. Briner's, P.O. Box 5607, San Mateo, Calif. 94402

**FREE** - U.S. Discount Catalogue. Shelton, Box 547B, North Miami, Fla. 33161.

**35 DIFFERENT** Old U.S. Revenue Stamps \$1.00. Winchester Stamps, Box 3592, Mansfield, Ohio 44907

**PENNY!** Approvals! Regardless catalogue! Kloster, 4164 52nd St., San Diego, Calif. 92105.

**PENNY** Stamp Approvals, Regardless Catalogue. CK Stamps, 17902 Marklee, Jamul, CA 92035

**ISRAEL** 15 Different 10c Approvals. Sam Chazen, Box 666, Delray Beach, Florida 33444

**FREE** U.S. Mint Set. Approvals. Hildebrand, Box 4867, Santa Clara, California 95054

**STUNNING! 100 BEAUTIFUL MINT PICTORIALS.** All Different Only 25 Cents with Attractive Worldwide Approvals. **VANSTAM,** Dept. PM-1083, P.O. Box 11272, Chicago, Illinois 60611

**FREE** 1982 Disney Issue. Request Approvals. Alpaugh, Box 225, Highbridge, NJ 08829

**WORLD FAMOUS PAINTINGS!** Complete set (8) 10c when requesting approvals. (Catalog value \$2.00). Tom & Jerry, Box 5594-PM2, Sherman Oaks, CA 91413

**CANADA.** 50 different 25c. Approvals. Droszky, Box 1-C, Sarnia, Ontario, Canada N7T 7H8

**"INVERTED ERROR"** - 100 Different United States, 50c with approvals. Luray, P.O. Box 7088, Silver Spring, MD 20907

**101 Large Pictorials** 50c when requesting worldwide approvals. Benat, P.O. Box 210244, Dallas, TX 75211.

**FREE!** 50 Mint British Empire Pictorials with Approvals. Stockland, P.O. Box 45036, Westlake, Ohio 44145

**U.S.** Stamp collectors regard **LOWELL P. DONALD** Company as **THE** source for better issues prior to year 1940. **BELOW WHOLESALE PRICES!** Send 20c postage for complete price list. Box 728, Rutland, Vermont 05701

**LOOK!** 362 World Stamps \$1.00. Worldwide Approvals. Klondike, Harrisburg, Ill. 62946

**WORLDWIDE** Stamps 600 different from 100 countries. \$6.00. Jay. 2104 Seville, Balboa, CA 92661.

**107 Different Triangles, Space, Animals, Etc.** \$4.00 Value. Only 10c. Approvals. Fayette Stamps, Dept. 418M, Fayetteville, NY 13066

**OLD U.S.** A Special Approval Service for Adults Seeking the Unusual, who want Value, who are not altogether Condition Conscious. Frogmore, Dept. 88094-P, Grand Rapids, Michigan 49508.

**"SPACE"** History Collection - Mongolia's latest Gigantic Bicolored's - Free. Approvals. William Deems, Ravenswood, West Virginia 26164

**FANTASTIC.** Five 4c Plate Blocks Only \$1.00. Free U.S. Wholesale Pricelists. Stamps A Plenty. Box 16682, Clayton, MO 63105

**FREE** Gift With Quality Approvals. Chapmans, Box 487-G, Galesburg, Michigan 49053

**ICELAND** Collection. 20 Different \$1.00. Approvals. Sandell, Box 6664, St. Paul, 55106

**COLLECTORS** 100 Different Chilean Stamps, only \$10.. Send (Chk or M.O.) To: Cervantes Co., POB 495, Temuco, Chile.

**U.S.** 6 Commemorative Plate Blocks, or 30 Mint Commemoratives \$1.00! Approvals. Gordon Davison, Conlocook, N.H. 03229

**100** Different U.S. 25c. Approvals. Bradley, Box 425P, Midlothian, VA 23113

**U.S. 25 DIFFERENT MINT INCLUDING SOUVENIR SHEET \$1.00. FREE LIST.** Brooks, Box 62, Brooklyn, NY 11229

**"WHOLESALE"** U.S.—Foreign Pricelist and catalog Free! Everything Guaranteed. Schneider, Box 1240, Grand Rapids, Michigan 49501

**50 MINT** or 200 used all different US \$1.00 approvals. Stamps, Box 1427PM, Bellflower, CA 90706

## COINS, TOKENS, CURRENCY

**COLORFUL** Worldwide Currency on Approval. Baldwin, Box 44, Moose Jaw, Saskatchewan, Canada. S6H 4N7.

**SEVEN** Different Mint Error Coins \$2.00. Coin Lists Free. Sayers, 1000 Unaka, Johnson City, Tennessee 37601

**100** Indian and Lincoln Cents. 1920's And Older \$10.00. Wesley Road, Box 171A, Waukon, Iowa 52172

## PHOTOS & PHOTO SUPPLIES

**DUPLICATING** Super 8, 8.8mm, 16mm. Free Catalog: Supplies - 35mm, Super 8, 16mm, Video. Superior, 442-Wells, Chicago, Illinois 60610. Established 1938.

## BOOK BINDING

**REBIND YOUR DAMAGED BOOKS.** With a few common tools and a homemade book press (plan included) you'll be able to handle anything from a torn hinge to a complete rebinding. Photocopy of article as it appeared in P.M. available Send for Plan X-93 - \$4.00 to: Popular Mechanics, Box 1014, Radio City Sta., New York, N.Y. 10101

## BOOKS & PUBLICATIONS

**THE MARK TWAIN APPROACH!!** Graphic Educator, Gallery Studio, 505 Franklin, Elkhart, Indiana 46514.

**BEFORE** you buy a business or start your own read this invaluable pamphlet \$3.00. Junjo, P.O. Box 38944P, Sarasota, Fla. 33581

**WINE IS "IN"** Be confident selecting and serving wine. German, French, Italian, Californian. Easily read book tells how. Money Back Guarantee. Send \$6. - Mika Enterprises, Dept. M103, P.O. Box 578370, Chicago, Ill. 60657.

**ANTIQUE GUIDE.** 690 Pages, 50,000 Prices, 500 Categories, Invaluable Aid, Order Now, \$10.95, \$1.50 Postage. Countrywide Products, D104, 223 Silverbell, Lake Jackson, Texas, 77566

**PUBLISHERS' OVERSTOCKS, BARGAIN BOOKS.** 2,000 Titles, all Subjects! Free Catalog: Hamilton's, 98-51 Clapboard, Danbury, CT 06810

**OUT-Of-Print** Books Found. Send Wants. Booklook, 51 Maple Ave., Warwick, N.Y. 10990

**WHY** Factories Close. Free pamphlet with \$1 trial subscription to biweekly socialist newspaper. The People (PM), 814 Industrial Ave., Palo Alto, CA 94303

**BECOME A WINE AND CHEESE EXPERT.** Learn to properly buy, store, serve foreign and domestic wines and cheeses. Book \$3.95 plus 75c handling. Bandel, Box 32, Lindenhurst, N.Y. 11757

**INDEX:** Magazine Articles Appearing 1978-82 on Such Topics as **SOLAR ENERGY, WIND POWER, FUTURE TECHNOLOGIES, ENERGY CONSERVATION, SPACE COLONIES, AQUACULTURE,** etc. Lists Over 1800 Articles. A Great Reference Guide. \$5.00. Alpha Centauri Enterprises, POB 756, Littleton, CO 80160

**MATHEMATICAL** Insights! Send \$5. SASE, to: Michael Gilbert, P.O. Box 2376, El Paso, TX, 79952.

**RAILROAD DATE NAILS:** Collecting For Fun. 30 pages of Information and Photos Describe Inexpensive, Interesting Hobby. \$5.95, Norell Press, 402B Harriet, Alpine, Texas 79830

**TMS PUBLISHING PRESENTS** Beautiful Skin and Healthy Nails. Two Reports, \$6.00. Box 206, Flint, MI. 48503

## PLAYS, SONGS, MANUSCRIPTS

**FREE** Songwriting Success Book! Top Records. Box 23505PM, Nashville, TN. 37202

## MUSIC INSTRUCTIONS & INSTRUMENTS

**POEMS** Set To Music. Nashville Music Productions, Box 40001-PM, Nashville, Tennessee 37204.

**PIANOS, PLAYERS, PUMP ORGANS.** Rebuild and repair. Catalog of "How-To" books, \$2.00 (refundable). Vestal Press, Vestal 11, New York 13850.

**CATALOG** for makers, repairers of stringed instruments. Imported tonewood, tools, parts, accessories, strings, cases. Fine European instruments and bows. Catalog \$1.00, includes 10% discount certificate. International Violin Company, Ltd., Dept. FW, 4026 W. Belvedere Ave., Baltimore, Md. 21215

**ACCORDION** Top Brands, Cordovox, Buy Direct. Tremendous Discounts. Trades accepted. Free brochure. PM, Accordion-O-Rama, 16 West 19th Street, New York, NY 10011

**COMPOSE SONGS** in twelve easy steps. Free information. "Songwriter" P1, Box 953, Torrance, CA. 90508.

**BAGPIPES** \$80 up. Brochures \$2. Mideastco, 2817 Cameron, Melbourne, FL 32901

**FREE** Catalog! Kits and Completed Harpsichords, Hammered and Appalachian dulcimers, guitars, banjos, mandolins, Hughes Dulcimers, 4419 West Colfax, PM, Denver, Colo. 80204.

**SUPER-SAVINGS** Guitar Strings, Accessories, Effects Pedals, Microphones, etc. Free Catalog. Super-Save Music, Box 944, Morganton, N.C. 28655

## SELF IMPROVEMENT

**FREE,** interesting, illustrated, self-improvement book catalog. Write: **CISCO HOUSE,** Suite 102A, 845 West Robinson Street, P.O. Box 2006, Carson City, Nevada 89702

**SUPERSHAVE — WITHOUT SHAVING CREAM.** Closer, smoother. Everyday products. Guide, \$2.00. Pike Publishing, 1131 Kenwood Street, Winston-Salem, NC 27103.

## EDUCATION & INSTRUCTIONS

**NECESSITIES!** Chapters Including: Weapons, Fear, Obedience, Wash, Anoint, Sprinkle, Sanctify, Covenant, Sabbath. 1127 NE Fifth St., Ocala, Fla. 32670

**DRAFTING** is a great career! Men, women. No previous experience or special talent needed. We train you at home in spare time. Get free facts. Write: North American School of Drafting, Dept. PBC93, 4400 Campus, Newport Beach, CA 92660

**FREE CATALOG—LEARN AUCTIONEERING!** Nashville Auction School, 233 E. Gaines St., Box 190, Department 2, Lawrenceburg, TN 38464

(Continued on next page)



## EDUCATION & INSTRUCTIONS

(Continued from preceding page)

**SUPERBRAIN! Scientific! Easy! Free Lesson! EDEMP**, Box 1462, Glendora, CA. 91740

**PIANO TUNING PAYS** - Piano tuning - Electronic organ servicing. Learned easily at home. Free booklet. Niles Bryant School, P.O. Box 20153, Sacramento, CA 95820

**"JET/GAS TURBINE CAREERS!"** Homestudy courses — theory, maintenance, overhaul — Established 1957. **AMERICAN JET SCHOOL**, Department PM-3, Darby, Montana 59829. (406) 349-2100

**REISCH WORLD WIDE COLLEGE OF AUCTIONEERING, INC.** World's Largest-48 Years. Term soon. Free Catalog. Approved for VA. Modern Auction Library "FREE" with enrollment. 515-423-5242 - Col. Gordon E. Taylor, P.O. Box 949, Dept. 19, Mason City, IA 50401

**LEARN** Asleep or awake. Records, tapes, equipment! Free catalog! Drawer PM-400, Ruidoso, New Mexico 88345

**AUTOSUGGESTION**. Sleep-learning headquarters! Tapes, records, books, Gigantic catalog free. Research Association, Box 24PM, Olympia, Washington 98501.

**DETECTIVE** Profession. Easy home study; free tie-tack or lapel pin, certificate, future. Professional investigators Training School, Dept. CP, P.O. Box 41256, Los Angeles, CA 90041

**LEARN** Sewing Machine repairing. A profitable Trade. Easy to learn. Free details. Sewing Center, 187 FR, Rochelle, GA 31079.

**USED** Courses! Books! Lists 25c. Smith's, 124 Marlborough, Salem, Massachusetts 01970

**HIGH** School at home, no classes. Diploma awarded Information Free, Phone Free Anytime 1-800-228-5600, or write: American School, Dept 31045, 850 E. 58th St., Chicago, IL 60637.

**HANDLE YOUR OWN LEGAL AFFAIRS**. Be a Paralegal. Accredited Attorney Instruction. Home Study. Free Catalog. Southern Career Institute, Drawer 103PM-2156, Boca Raton, Florida 33427. (305) 368-2522.

**PREPARE** to better handle your business, political and social opportunities. The Blackstone School of Law has met the law training demand for almost a century. Information: 307 No. Michigan Ave., Chicago, IL 60601

**FREE** 120 page Career Opportunities Guide - shows how to train at home for top paying jobs. Granton Institute, 263A Adelaide Street West, Toronto, Canada M5H 1Y3.

**UNIVERSITY DEGREES BY MAIL!** Accredited Bachelors, Masters, Ph.D.s... Free revealing details. Counseling, Box 317-PM10, Tustin, California 92680.

**LOCKSMITHING:** Free book. Locksmithing Institute, Dept. 310-103, Little Falls, NJ 07424

**FULLY - ACCREDITED COLLEGE DEGREES** By Mail!! Free Facts Revealed. Careers-PM10, Box 740886, Tulsa, Oklahoma 74147.

**TYPEWRITER** Repair at home. Money-making career. Typewriter Inst., 147A Crooks, Paterson, N.J. 07503

**FREE** Information Real Estate Appraisal College. International College Real Estate Appraisal, Dept. 190, Lawrenceburg, Tennessee 38464

**BELL'S BUILDING MAINTENANCE SCHOOL**. Details. P.O. Box 17095, Kansas City, MO. 64132

**PRIVATE DETECTIVE or FINGERPRINT TECHNICIAN** Training at Home. Detective Kits. Badge, Diploma. **GLOBAL SCHOOLS**, Box 191-PM, Hanover, MA 02339

**TYPE WELL IN THREE WEEKS!** Guaranteed Success in Minutes a Day with Easy "Teacher-on-Tape" Method! Details: Croftshire-6J, 409 Bella Vista, Grand Blanc, Michigan 48439

**BECOME A RADIO ANNOUNCER**. Pros tell How. Send \$4.00 for Booklet. Northeast Communications, P.O. Box 296, Cheshire, Connecticut 06410.

**LEARN BOOKKEEPING/ACCOUNTING**. Great opportunities for men/women. Write: ACI, Dept. SA339, 2118 S. Grand, Santa Ana, CA 92705

**FREE** Lesson-Find Yourself... Find Success! Frank Tibolt, 2819M Carmel, Glendale, 19038.

**TWENTY-EIGHT VITAL HIGH SCHOOL SUBJECTS!** Four Volumes, \$28.00. (Satisfaction Guaranteed). Kauler Company, Box 10304, Pompano Beach, FL 33062

**COLLEGE DEGREES** By Mail. Accredited Bachelors, Masters, Ph.D.s. Free Facts Revealed. Careers-PM10, Box 45886, Tulsa, OK 74147.

**UNIVERSITY DEGREES BY SPECIAL EVALUATION** of **EXISTING** Job Experience, Education, Achievement. Fast, inexpensive. Call (614-863-1791). Or Write: Box 13151-T10, Columbus, OH 43213

**EXTENSION** And Post-Graduate Awards in Philosophy, Art, Science, Botanic, Medicine, Homeopathy, Radionics, and others. 30 subjects Curricular free (airmail \$1.00 refundable). Registrar, Sussex College of Technology, Highfield, Daneshill, Sussex, England.

**RADIESTHESIA**, Radionics, Dowsing E.S.P. Courses and Equipment Illustrated Catalog \$1.00 (refundable) Established 27 years. Dept. PM/R, Bruce Copen, Highfield, Daneshill, Sussex, England RH17 7EX.

## EMPLOYMENT INFORMATION

**ROCKY MOUNTAIN EMPLOYMENT NEWSLETTER!!** Colorado, Idaho, Montana, Wyoming!! Exclusive computerized openings - ALL occupations - greatest weekly selection! **FREE INFORMATION!!** Intermountain-L, 6724W Dublinloop, Colorado Springs, Colorado 80918.

**AUSTRALIA** - The World! 50,000 Jobs! Top pay. Transportation. Computerized reports \$2.00. Jobworld, Box 681E, Cypress, CA 90630.

**RIVERBOATS** - Tugs \$15,000-\$60,000. Expenses paid. Work month. Home month. Experience unnecessary. All water-ways including Alaska, Hawaii, Free report. Send stamp envelope. Marine Employment, Box 207, Central, Indiana, 47110

**JOBS!!! COLORADO, WYOMING, UTAH, IDAHO, MONTANA**. Weekly Newsletter with 200+ **CURRENT** Jobs!!! All Occupations. Free Details! Mountainwest, 925-PM Canyon, Logan, UT 84321

**RESUMES** — How to Write One. Instructions and Samples \$2.00. Info-Mart-M, 3100 N. St. Louis, Chicago, 60618

**GOVERNMENT JOBS** - Thousands of vacancies must be filled immediately. \$17,634.00 to \$50,112.00. Call: 1-716-842-6000, Ext. 3946.

**JOBS** Overseas - Big money fast. \$20,000 to \$50,000 plus per year. Call 1-216-453-3000. Ext. 4566

**AUSTRALIA NEEDS YOU!** Jobs! Transportation! **NEW-EST COMPUTERIZED REPORT**. \$2.00. Wanderlust, 561 West Campbell, #303, Richardson, Texas 75080

**CRUISESHIPS ARE HIRING!** \$15-\$29,500! Caribbean, Hawaii, World. Call for Guide, Directory, Newsletter. (916) 722-1111 Ext. CruisePM

**UNEMPLOYED?** Career Change? Occupational Factsheets. . . . . over 250 careers. Free list. . . . Send SASE. Hamlin, P.O. Box 37665, Los Angeles, Calif. 90037

176 Sample Job Interview Questions \$2.00. G. B. Company, Box 19410-P, San Diego, California 92119

**SAUDI ARABIA**. 126 Pages Of Vital Information. 400 Employers Identified. Guaranteed. Send \$7.50 To: Doug Lemons, Box 6805, Thousand Oaks, CA 91360

**HOW-TO BECOME A RADIO ANNOUNCER-DJ**. \$4.00 Guaranteed. Radio, P.O. Box 475, Collinsville, VA 24076

**WORK** Overseas \$20,000 - \$60,000 opportunities! For information Call 317-839-1712 Ext 24.

**IMPROVE YOUR JOB INTERVIEW SKILLS**- Dynamic 24 Page Booklet Filled With Tips On Effective Techniques. Written By Testing Expert and Personnel Officer. Send \$4.00 To: Interview (PM), P.O. Box 43, Davis, CA 95617

## HELP WANTED

**AUSTRALIA WANTS YOU!** Jobs! Big Pay! Transportation! Newest Handbook — \$2.00. **AUSTRALIAN INTERNATIONAL**, Box 19107-AJ, WASHINGTON, DC 20036.

**OVERSEAS** Employment . . . \$20,000 - \$60,000 +. Free Report! Employment, Box 19760-AJ, Indianapolis, Indiana 46219.

**WORK AND TRAVEL FREE!** Cruiseships and Airlines need Help. all Occupations. For information Call: 602-998-0426 Ext. 700.

**WORK** at home jobs available! Substantial earnings possible. Call 504-641-8003 ext. 10 for information.

## FOR INVENTORS

**INVENTORS SALES MANUAL** Free information. F-M Service, 7345 Harlem, Niles, IL 60648

**KNOWLEDGE**. Unbias information. Innovation process. Idea to product. Send \$1.00 for further information. Large product discount. Limited time. **TKE**, Box 237-B Brooks Road, Binghamton, N.Y. 13905

**NONPROFIT** Foundation helps inventors. Widest range of services. Free recording forms. Free evaluation. Affiliated Inventors Foundation, 501-B, Iowa, Colorado Springs, CO 80909

**REGISTERED PATENT ATTORNEY** Washington D.C. Suburb. Donald A. Kettlesstrings, 414 Hungerford Drive, Rockville, Maryland 20850

**PATENT IT ECONOMICALLY!** Free Details. N. Rainer, 2008 Fondulac, Richmond, VA 23229

**PROTECT** Your Invention. Registered Patent Attorney. Many Years Experience, all Fields. Individual Inventor's Problems Given Special Consideration. Very Reasonable Charges. Write for Free Information. Paul H. Gallagher, 2530 Crawford Ave., Evanston, Illinois 60201

**IDEAS, INVENTIONS, NEW PRODUCTS WANTED** **FOR** Presentation to Industry and Exhibition at National Technology Exposition. Call 1-800-528-6050. Arizona, 1-800-352-0458. X831 **INVENTION MARKETING INC.**, **KIT PM2, 701 SMITHFIELD STREET,** **PITTSBURGH, PA 15222**

## PATENT/TRADEMARK SEARCHES

**DOES** your idea merit protection? Let our firm, which includes former Patent Examiners, review the records of the U.S. Patent and Trademark Office. Report and legal opinion provided. Patent searches \$100. Trademark searches \$40. Submit fee with search request. **CLOSE & HERSH PATENT AND TRADEMARK ATTORNEYS** SUITE 1200, 1000 CONNECTICUT AVENUE, N.W. WASHINGTON, D.C. 20036 (202) 293-1110

**PROFESSIONAL PATENT SEARCHING**. Novelty search \$110. Fast, reliable service done by staff of professional patent searchers. Write: **QRQ Associates**, Box 2153, Arlington, VA 22202.

**LEARN** How to offer your invention for sale or license. Free Booklet outlines procedures, royalty rates, requirements. Kessler Sales Corporation, C-5-F1, Fremont, Ohio 43420.

**"SELL** Unpatented Inventions" Complete information \$4.95, VISA accepted. EMTS, Box 33178, Tulsa, Ok. 74135.

**VALUABLE** Information Aid for the Inventor \$3. P.O. Box 11531, Tucson, Arizona 85734

**INVENTORS:** What To Do And Not To Do With Your Inventions. Take It From Someone Who Has Been Through It All. Book Only \$5.00 Order Today. Inventors Handbook, Box 255, Comstock Park, Mich. 49321

**PROTECT YOUR INVENTION**. Registered Patent Attorney. **FREE** Preliminary Review Of Your Description. Box 382PM, Millwood, NY 10546

**PATENT DRAWINGS** - Certified, Bonded, Patent Engineering, Box 365, Mayo, Maryland 21106.

**PATENT AND DEVELOP** Your Invention. Registered Patent Agent and Licensed Professional Engineer. Send for **FREE PATENT INFORMATION** Every Inventor Should Have. Richard L. Miller, Woolworth Building, 233 Broadway, Suite 3612-M, New York, N.Y. 10007. (212) 267-5252.

## INVENTIONS WANTED

**EARN ROYALTIES**. **NUPRODUX INTERNATIONAL**, 1377 K. NW 141, WASHINGTON, DC 20005

**INVENTORS! IDEAS HAVE VALUE!** Ever think of an idea, forget it and see it later on the market? Many people don't forget, act quickly and are rewarded by American industry. Write down your idea! We offer free disclosure registration and initial consultation regarding your idea's potential value. Call or write without delay for your free information package. **AMERICAN INVENTORS CORPORATION**, 82 Broad Street, Dept. PM, Westfield, MA 01086. (413)568-3753. A Fee Based Marketing Company Offices, Coast to Coast.

**INVENTORS:** Free information on offering your invention for sale. Kessler Sales Corporation, C-5-1W, Fremont, Ohio 43420

**NEW IDEA??** If you have a clever new **IDEA, INVENTION, OR IMPROVEMENT** - We'd like to review it. **STRICTLY CONFIDENTIAL - FREE** Disclosure Forms-American Patent Research Corporation. \* **RESEARCH** \* **PREPARATION** \* **NEGOTIATION** - 1-800-257-7880, New Jersey 1-800-322-8650.

## REAL ESTATE & FARMS

**FREE! FALL-HOLIDAY '83 CATALOG!** Over 5000 properties, over 2000 pictures! Values in every type of real estate, many owner financed! From 600 offices in 43 states! Get your **FREE** copy **NOW!** **STROUT REALTY**, Plaza Towers, Dept. 5800, Springfield, MO 65804. Call toll free: 1-800-641-4266 or in Missouri call collect: (417)862-4402.

**CANADIAN** Country Properties. Our 88th year. Terms available. Catalogue airmailed \$1.00. Dignam Corporation, Suite 496, 85 Bloor East, Toronto, Ontario M4W 1B5.

**NEW . . . FREE CATALOG!** Top real estate values coast to coast! Please specify type property and location desired. **UNITED FARM AGENCY**, 612-PM West 47th, Kansas City, MO. 64112.

**GOVERNMENT LANDS FROM \$7.50 ACRE!** Homesites, farming, vacationing, investment! "Land Buyer's Guide" plus nationwide listings—\$3.00. Lands, Box 19107-AJ, Washington, DC 20036.

**HOW TO GET RICH IN REAL ESTATE:** Beginner's Instructions!! Ten Success Steps. Free Details. Nowak Publishing, 1101PM Clay, San Francisco, CA. 94108

**TRUST** deeds purchased. We pay cash. Stop collecting payments. Free information. Write: **JL Enterprise**, Box 7021, Los Angeles, CA 90022.

**TENNESSEE** Farm and Mountainland. Free Lists. Kay Realty, Rogersville, TN 37857. 615-272-9321.

**CANADIAN** property and Lake Frontage from \$47 per acre. Exchange Privilege. Investment! Catalogue \$1.00. Canadian Estate Land, Dept. 22C, 2411 Yonge Street, Suite 303, Toronto, Canada M4P 2Z1



## EXPORT-IMPORT

+2500 "Fast Sellers". Free brochures! Allrightpro. Box 91309-B10, Cleveland, Ohio 44101

## PLASTIC BAGS

ALL Sizes. Buy Small Quantities. Free Catalog. SAKel, 6151-C Colbath, Van Nuys, Calif. 91401

HUNDREDS Of Sizes, Lowest Prices, Free Catalog. Action Plastics, 14600 83rd Lane N.E., Minneapolis, Minn. 55434

## BUY IT WHOLESALE

BELTS and Buckles. Complete line fast sellers, including truckers, motorcycles, wildlife, westerns etc. Big Profits. Complete dealer set up. Catalog \$1.00. Anchor Specialties, Box 3958-BPM, North Providence, RI 02911

400,000 BARGAINS Below Wholesale. Many Free! Liquidations . . . Closeouts . . . Job Lots . . . Single Samples. Free Details. Bargainhunters Opportunities, Box 730-A, Holland, Michigan 49423.

CLOSEOUT Jewelry 55c dozen. (Catalog 25c). Roussels, 107-1631 Dow, Arlington, MA 02174

CLOSEOUTS! Discounts! Below wholesale! Freebies! Samples! DDN, Box 20152-PM, Ferndale, Michigan 48220.

EARN MONEY selling rings, jewelry, buckles, watches—buy direct. 130% below retail. Catalog \$1.00 (refundable). Anka-PM, 90 Greenwich Ave, Warwick, RI 02886

WHOLESALE CATALOG \*\* Chainsaw, Three-Wheeler, Motorcycle, Snowmobile, Small Engine Parts, Accessories. Send \$1.00. Manufacturer's Supply, Box 157-PM5, Dorchester, WI 54425.

## ADVERTISING AGENCIES, ADV. SER., MAILING LISTS

FRESHEST Opportunity Seekers Names. Free Details. Venlists-PM, Box 336, Riviera, AZ 86442

## RUBBER STAMPS

BARCO Type Founders. Type and Rubber Stamps catalogue. Mail \$1.00 refundable on first order. 237 S. Evergreen, Bensenville, 60106.

## PRINTING PRESSES, RUBBER STAMP OUTFITS

TYPE for printing. Catalog \$1.00-deductible 1st order. Quaker City Type, P.O. 3, Box 134, Honeybrook, PA 19344

MANUFACTURE Rubber Stamps. Regular and Pre-inked. Catalog 1-800-851-4945. Jackson, Brownsville Rd., #110, Mt. Vernon, IL 62864.

TYPE Fonts. Hand Printing Presses. Supplies. 120 Pages. \$1.00 Deductible first order. Acme Type, 1720 N. Marshfield, Chicago, 60622

COMPLETE Rubber Stamp Outfits. Supplies. Same day shipment. Sign Engraving Machines. Wholesale Catalog \$1.00 Deductible. Star Stamp, 1720 N. Marshfield, Chicago, 60622

## PRINTING AND SUPPLIES

QUICK Copy Printing. Low Prices. Write: Nationwide, #14 North Main, Bloomington, Illinois 61701

THERMOGRAPHED Business Cards. Free Samples. P.J.W. Box 134, Barborton, Ohio 44203

PRINT-Publish Equipment Bargains Galore. Murl, 329 Gunkel, Dayton, OH 45410

QUALITY BUSINESS PRINTING—Business Cards, Envelopes, Stationery, Discount. Free Catalog. Dunn's Distributors, P.O. Box 21083, Lansing, Mich. 48909

## CLOCKS, WATCHES, OLD GOLD, JEWELRY

HIGHEST CASH for Gold, Jewelry. Gold Teeth, Rings, Diamonds, Watches, Silver, Platinum, Mail Articles Today. Free gift with information. Chicago Gold & Precious Metals, 6 E. Monroe, Dept. 258, Chicago, 60603.

LCD watch. \$2.50. Penwatch, \$3.60. Catalogue \$1.00. Reliant, P.O. Box 33610, Sheungwan, Hong Kong

TAKE NO CHANCES. Deal with oldest, most reliable firm in old gold business. Established 1934. We buy Gold, Silver, Platinum, Diamonds. Highest Cash. Free Information. Rose Industries, 29-A East Madison, Chicago 60602

CLOCK and Watch Repairing books, tools, materials. Free book catalog. North American, Box 77-AK, Fox River Grove, Illinois 60021.

DIAMOND NECKLACES. Genuine Herkimer Diamonds-gold chains. Closeout \$5.95. P.O. Box 3034, Fort Myers Beach, Florida 33931

WHOLESALE CLOCKS. Quartz Battery Movement From \$2.85. Catalog \$1.00. Clocks, Rt 3, Box 94E, Foxworth, MS. 39463

## QUARTZ CLOCK MOVEMENTS, LIFETIME WARRANTY. FREE CATALOG. BOX 141, WHITMAN, MASS. 02382

## STONES, MINERALS

GET Free catalog no serious rockhound, gem cutter, jewelry maker, hobbyist or craftsman can be without. Full of bargains, exclusive items, low prices from largest suppliers and authorities in the field. Free new catalog just off the press, yours for the asking. Write: Gneper's, Dept. 1, 900 South Arroyo Pkwy., Pasadena, California 91109

## TREASURE FINDERS

FIND Lost coins, jewelry, buried treasure, gold nuggets, relics. New revolutionary patented detector analyzes objects. Tremendous range. No ground pickup. Free catalog. Gardiner, 4729M N. 7th Ave., Phoenix, Arizona 85013

TREASURE- Locate quarter mile away with ultra sensitive locator - brochure free. Research Products, Box 270270 - AMC, Tampa, Florida 33688

SAVE up to 40% on new metal detectors. All major brands including Whites and Garrett. FREE discount price list. Northwoods General Store, P.O. Box 9874PM10, Madison, WI 53715. (608) 274-4680.

## PROFITABLE OCCUPATIONS

\$80. Hourly average profit repairing large appliances. Free Details. 8690 Aero Drive, M184, San Diego, Ca. 92123

REPAIR Lawnmowers, thousands of parts and tools. Wholesale list 35c. Ellwanger's, PO Box V, Port Jervis, NY 12771

PLASTERCRAFT . . . Profitable Home Business 3000 Molds Available. Details. Lynnette, 6251C Mentpark, Mentor, Ohio 44060.

FREE Catalogs. Repair air conditioning Refrigeration. Tools, supplies, full instructions. Doolin, 2016 Canton, Dallas, Texas 75201.

FT. SMITH Auction School, Ft. Smith, Ark. 72903. Resident & Home study. Veteran Approved.

TECHNICAL WRITERS make big money! Free details. TekPubs, Box 2458-P, Oroville, CA 95965

MAKE \$35 HOUR At Home Sandblasting Designs in Glass. Details. ETCHING, Box 445, Strathmore, CA 93267

## SALESMEN-DIST.

MAKE EXTRA MONEY DURING YOUR SPARE TIME! Show our New Line of Calendars, Pens and Advertising Gifts to local firms. Prompt, Friendly service from small town AAA-1 Company in our 74th year. No Investment or Collections. Weekly Commissions. Set your own hours. Full Time potential. No Experience Necessary. Write to: Frank Buckley, NEWTON MFG. CO., Dept. APM10, Newton, Iowa 50208

SELL SENSATIONAL LOW-COST BURGLAR ALARM. Lightning seller. Exceptional margin. Samples for trial. Northwest Electric-PM-10, Box 1046, Mitchell, SD 57301.

MAKE Extra \$1000's Monthly Without Investment! Millions need POWER-X™ Oil Treatment—Saves Engine Wear, Gasoline, Money! Alquist, GT10G, Milford, Pennsylvania 18337. (Telephone 717-296-7416).

## AGENTS WANTED

SPARE TIME CASH. Sell Famous Hanover Shoes. Samples, sales kit free. No experience needed. No age limit. Big commissions. Hanover Shoe, Dept. 3727, Hanover, PA 17331.

SELL How To Make Money Books by mail. Millions of potential buyers. Requires only few hours weekly to make fabulous money. I'll furnish you with everything needed. Guaranteed. Send \$2.00 for details. Howard Enterprises, 201 Rue Dubourg, Suite 534, Dept. 3M, LaPlace, LA., 70068

MAKE Thousands selling Money-making books by mail. Full Details \$1.00 to: Opportunity Knocks, Box 1027B, 1204 Avenue U, Brooklyn, New York 11229

AGENTS Wanted - Hundreds Of Dollars A Week Possible Working Just Part Time. Free Details. Send \$1.00. STONEHILL, ROSS COMPANY, P.O. Box 1314, Roseburg, Oregon 97470

85 MILLION PROSPECTS. Sell money making books thru the mail. We'll provide guidance and supplies needed. Details \$1 (Refundable). JFV Enterprises, P.O. Box 661127, 1-A, Miami Springs, FL 33266-1127

SINCERE Book Sales Agents Wanted Now! Part-Time Or Full. Do Not Confuse With Usual Work-Off Offers. No Experience Needed. Full Details Send \$1.00 To: Starlight Publications, 3682 Clarrington, I-A, Los Angeles, Calif. 90034

MAKE Extra Money On Weekends. Be an Agent for the National Flea Market Dealers Association. Tremendous Potential. For Full Details Send \$2 to: National, Box 16722, Atlanta, GA 30321.

MONEYMAKING Opportunity. Help Sell Our Amazing Books by Mail. Details \$1.00: Publication Company of America, Box 4971-PM10, Tyler, Texas 75712

MAKE MONEY IN SPARE TIME. As a subscription sales representative for leading national magazines, you can earn generous commissions while learning the art of selling. Instructions and supplies will be sent to you free. Send this ad with your name and address to: POPULAR MECHANICS, Dept. AB-L, 250 W. 55th St., New York, NY 10019

## BUSINESS OPPORTUNITIES

IMPORT-Export opportunity, profitable world-wide, mail order business from home, without capital. We ship plan for no risk examination. Experience unnecessary. Free Report. Mellinger, Dept. H270C, Woodland Hills, California 91367

MONEY TROUBLES? Solve them easily. No Gimmicks. Quick results. Moneyback Guarantee. \$9.95. Free Details. DMI, RM201, 311 N. Alice, Dothan, AL 36303

RENT RAGS TO BUSINESSES. \$300 Daily. Free Information. RAGS, P.O. Box 03128, Portland, Oregon 97203

FREE Details - 1499 Money-making "Cream Of Crop" Little Known Businesses And Ideas. Macpennies, 323 Franklin #804 M250-M, Chicago, 60606-7095.

\$100 Per Day Possible. Wholesaling Merchandise. Start At Home Immediately for Profitable Christmas Season! Details. S.J.L. Marketing, Box 281, Iola, KS 66749

BECOME Tax Consultant. Our students earn \$1,000-\$3,000 every tax season preparing returns evenings. State approved. National Tax School, Monsey, 2KQ, New York 10952.

MULTI-LEVEL MAILORDER! NEW COMPANY plus UNIQUE PRODUCTS equal, "RECORD breaking PROFITS." Will prove! Free information, "detailed cassette." SFOA, 6940 I 2 70 Avenue North, Pinellas Park, FL 33565

GET RICH with mail order business. Free details. Marydean Co., Box 3396, Pueblo, Co. 81005

SELL SIMPLE INFORMATION. I've earned \$44,654/yr. Helping Others Free information. Box 10179, Alexandria, Virginia 22310

RINGS, WATCHES, JEWELRY - 600% profit. Free Sales Kit Catalog. Spotlight, 2053, 156 Fifth Avenue, New York, NY 10010.

GREAT OPPORTUNITY to start a profitable home business! Book reveals how. Details FREE! UK Enterprises, 3017 St. Clair Ave, Suite H110, Burlington, Ontario. L7N 3P5

MAKE MONEY WOODWORKING - Easy profits making unusual gifts, toys, novelties. Free details. Williams, 32K Titus, Glen Cove, NY 11542

\$700 Per month earnings possible preparing income tax returns at home or tax office. We show you how. Quickly learned. Details free. No salesman. Federated Tax, 2065 Montrose, Chicago, 60618.

KEROSENE HEATER REPAIR Millions need service. Short course, discount parts, instructions. Send \$3.95. Kerosene Heater Headquarters, Box 651P, Altoona, PA 16603

MAILORDER Opportunity! Start profitable home business without experience or capital. Write for free book, plus details. No obligation. Mail Order Associates, Inc., Dept. 792, Montvale, NJ 07645.

SPARETIME Business No Selling. Details. P.O. Box 18121, Louisville, Kentucky 40218

PROVEN HOME BUSINESS OPPORTUNITIES. Write! Helms, 850 Kimball Rd., #33, Red Bluff, CA 96080

GUARANTEED EFFECTIVE SAVINGS/INVESTMENT METHOD Tested Way to Organize your Money. Free Details. Terry McGuirk, PM10, 252-51 Leith Road, Little Neck, NY 11362

ALUMINUM SCRAP - Recycle - SELL FOR \$25.00/ POUND! Free Information: Industrial - PM10, Box 127, Alexandria Bay, New York 13607

PIANO Tuning learned quickly at home! Free information. Empire School, box 1014, Jupiter, Florida 33458

HUGE WHOLESALING PROFITS! Free Sample. Details. JPC, PM10, 2276 Rohner Ct., Simi Valley, Cal. 93063

BIG PROFITS! Proven, GUARANTEED Home Business! No Risk, Capital or Experience Needed. FREE details. Boco International, 8563 Pleasant Run, Dept. PM10, Colleyville, Texas 76034

SOLAR Heating learned quickly at home! Free information. Empire School, Box 1014S, Jupiter, Florida 33458

"TAKE Catalog Orders. We drop-ship 2500 best-selling specialty products. Lowest below wholesale prices. Immediate delivery. Spectacular home business opportunity. Free Book. SMC, 8401 De Soto Ave., Dept. 20-34, Chatsworth, CA 91311."

ASSEMBLE PRODUCTS AT HOME. Many opportunities paying High Weekly Profits presently available without investment. Write: Businesses, 82B Brighton 11th, Brooklyn, New York 11235.

VINYL'S Where the money is! Professionally repair, refinish, recolor furniture, luggage, car tops. Quick, easy. Two small \$20 jobs a day earn you \$1,000 a month. Homes, cars, offices, restaurants, unlimited customers. Start earning after a few days practice. Sensational details free. VIP, 2007 Montrose, Chicago, 60618

(Continued on next page)



## BUSINESS OPPORTUNITIES

(Continued from preceding page)

**PIANO** Tuning quickly learned with home study courses. Diploma granted. American Tuning School, 17050 Teller Drive, Morgan Hill, Calif. 95037.

**PICTURE** Framing—Profitable full or spare-time business. Easy to learn with handbook-course "Guide To Picture Framing Profits." \$3.00 Guaranteed. Free framing-supplies catalog included. Japs. 126-PM Seventh North, Hopkins, Minnesota 55343.

**FREE BOOK** 2042 Unique Proven Enterprises. Fabulous "unknowns." Second Inflation Income. **HAYLINGS**, Carlsbad, CA 92008

**LEARN** Sewing Machine Repairing. Men. Women. Lucrative Profits. Gresslin Correspondence School. Box 5104, Spencer, Iowa 51301.

**NEW** Discovery in Battery Reconditioning . . . Eighteen Months Guarantee Means "Big Profits Fast." Electone, 7415 Gable Drive, Little Rock, AR 72205

**VENDING MACHINES.** No selling. Routes earn amazing profits. "Big Catalogue FREE." Parkway Corporation, 1930 PMB Greenspring Drive, Timonium, Maryland 21093

**WOODWORKERS - IDEAL HOME BUSINESS.** Free brochure! Pine Shop, West Peterboro, NH 03488

**BUMPER STICKER PRINTING DEVICE.** Cheap, Simple, Portable. Free Details. Bumper, POB 22791 (GE), Tampa, FL 33622

**MAKE** Rubber Stamps. Highly Profitable Business. Free Details. Stamper, POB 22809 (GE), Tampa, FL 33622.

**MAKE MONEY NOW** from Microcomputer Boom! Box 218, Washington, IL 61571

**PROFITABLE GOLD FOIL PRINTER.** Personalize business cards, pencils, matches. Free Details. Gold, POB 24986 (GE), Tampa, FL 33623.

**PRODUCE** Beautiful Copper Or Brass Signs. Fast, Inexpensive, Profitable. Details. Signet, 50 High, Suite LL7-C, Buffalo, N.Y. 14203.

**\$100.00+ DAILY!** Reconditioning used car batteries. Secrets others don't tell. Free Information. Battery Outlet, Box 3300, Hickory, N.C. 28603.

**HOW TO BECOME AN INDEPENDENT TRUCKER.** Detailed Instructions. Author over 20 Years Trucking Experience. Paperback, Send \$14.95 Plus \$1.00 Postage. Venture Products, Inc., 5221 Dixie Highway, Louisville, Kentucky 40216

**EARN** excellent money washing windows. Detailed pamphlet, based on eight years experience, covers all phases. Send \$10.00 to: Mike Badders, 144 West Eagle Road, Havertown, PA, 19083.

**SELL** Books by Mail! Free Dealership. Newlife, Box 85041-P10, Los Angeles, CA, 90072.

**CASH IN** on the Computer Boom. Details Free. Docutech, 3135 Shofner, San Jose, Calif. 95111

**E-Z** Riches in your own business! Millionaire reveals how! Free details — Moneeco, Box 408065PM2, Chicago, Illinois 60640

**PROFITABLE HOME OPERATED BUSINESSES** - Free Details - Flowers Enterprises, 511 North Mulberry, Dept. PM1103, P. O. Box 191, Butler, Alabama 36904.

**\$500.** Weekly! Wholesaling! Part-time. Midwest Wholesalers, Box Z, Siren, WI, 54872

**MULTI-Level** Mailorder, Two Opportunities. Details. O'Neil-M, 10 Oak Lane, Suisun, CA 94585

**RECONDITION JUNK BATTERIES.** \$40,000 year, spare time! Easy. Free Information. Owen, 771PM, Battle Ground, Washington 98604.

**PROJECTION TV** . . . Make \$\$\$'s assembling Projectors . . . Easy . . . Results comparable to \$2,500 projectors . . . Your total cost less than \$20.00 . . . **PLANS, LENS & Dealers** information \$17.50 . . . Illustrated information **FREE** . . . Macrocoma-88X, Washington Crossing, Pennsylvania 18977. Creditcard orders 24 Hrs. (215) 736-2880.

**COLLECT ALUMINUM** - Recycle Yourself - **MAKE \$25.00/POUND!** Free Information: Industrial - PMA, Box 127, Alexandria Bay, New York 13607

**FIRE YOUR BOSS!** Easy, Profitable Businesses. Begin immediately. Free Information. ASD, 830 Watt-L14, Box 255428, Sacramento, CA 95855.

**"PROFESSIONAL" GIANT SCREEN PROJECTION TV** . . . "Don't be fooled by cheap imitations!" . . . "Build and sell the best with lenses and screens utilized by Sony, Zenith, Pioneer, and Magnavox!" . . . Simple construction! . . . Unlimited profits! . . . Illustrated dealers information and complete parts catalog \$2.00 . . . Money Back Guarantee! . . . **POLI-VISION**, 187B Cypress St., Throop, Pennsylvania 18512

**FREE!** Sample Issue Of "Money-making News." Write: Stella, Box 855, Oakland, NJ 07436.

**AUCTIONEERING** career can be yours. **FREE DETAILS** on Complete Home Study Course. Write: **AUCTIONEER TRAINING**, P.O. Box 34, Delta, Colorado 81416

**AMAZING!** Plant! Earn Hundreds Weekly at Home. Guaranteed! Start immediately. Free Details: Golden, Box 9383, Boise, ID 83707.

**HUGE PROFITS** selling attractive gifts. 100's. Catalog \$2.00 refundable. JRP Enterprises, Dept PM10, 5201 Clarendon Rd, Rm 3A, Brooklyn, N.Y. 11203.

**SELL** oil paintings on velvet. Send \$9.95 for beautiful sample 12x18" w/frame. Refundable. Free brochure. Museo de Mexico, Inc., Box 1045, Bonita, CA 92002. Call 619-691-8855

**CASH MACHINE!** Start yours now! Free details. Valmar, Box 6688-6, Lincoln, NE 68506

**\$40.00 ANNUAL PROFIT** Potential In Books By Mail Business!! **FREE** \$7.95 Book, Plus **FREE** Wholesale Books Sources Directory!! Send \$3.00 Postage-Handling. MIC, 1424 Inshill-M11, Brook, MS 38530

**GUARANTEED** Lifetime Income Selling Books By Mail Directory Of Wholesale Book Sources. \$3.00. Nobles, 1052 16th St., #4, Oakland, CA 94607

**FREE COUPONS** With Inquiry! Distribute Coupon Books! M. Shapleigh, 8101 Cantrell Road, #503P1, Little Rock, AR 72207

**EARN \$7000/MONTH** by 3rd month, Details, Emtron Corp, Box 494, Avon, MA., 02322

**MONEY MAKER!** Hottest Electronic Products Available Today! Radar Detectors, Car Stereo's, Speakers, Video Recorders, Computers And More. **FREE** 94pg wholesale catalogue At 40-60% off retail. Send \$5.00 for Postage And Handling **TODAY** to: Save, 1782 Marietta Blvd., Atlanta, GA, 30318

**PROVEN MONEYMAKING** and Business Opportunities Now Available. Free Details. Sandstrom Ent., P.O. Box 2737, Costa Mesa, CA. 92626

**\$750** Next Weekend? Incredible! Free Information Lew, 3209 N Institute, Dept. 1-10, Colorado Springs, CO 80907

**START WORKING FOR YOURSELF.** Sell Books by Mail. Full or Part Time. No experience Needed. Details \$1. DLV Enterprises M10, P.O. Box 2177, Oroville, CA 95965

**WANTED !! MULTI - LEVEL MAILORDER DEALERS !!** Multiply profits ten times !! Write !! ESP - 146, 377 Antenor, Pittsburgh, Penna. 15210

**INTRODUCTORY OFFER.** "21 Easy Home Businesses". Full or part time. Little or no investment. Fully explained. New book. Now only \$5.00. **SATISFACTION GUARANTEED.** Midland Books, 269 North Eaton, Indianapolis, IN 46219.

**SELL BADGE MACHINES** and Supplies Seven Sizes. Debber MFG., 3912M West McKinley, Milwaukee, WI 53206

**EARN** \$2,000/month offering loans, starting part time. Prestigious opportunity. PFA, Box 84068P, Los Angeles, CA 90073

**CLIP** Newspaper articles. \$2.00 to \$35.00 each. Free report. Publications, 2229 E. Burnside, Dept. 118, Gresham, Oregon 97030

**"HOME BUSINESS Opportunities Newsletter".** Free Sample. Trendmaster, Box 1207-B, Banning, CA 92220.

**\$1,000.00** Monthly Selling New Fortune Building System By Mail. Free Information. JKL, 323 Franklin #804-L131/PM, Chicago, 60606-7095.

**\$15 TO \$50** plus per Hour with pickup truck. Instructions \$9.95. Readers Jury Publishing, Drawer 33993, Osborn Station, Phoenix, Arizona 85067.

**BUILD LOG SPLITTERS.** Send \$10.00 for blueprints of three designs and price lists. **HYDRO-AIR** of Colorado, P.O. Box 7175, Denver, CO 80207

**MAKE** Your Dreams Of Riches A Reality. Millionaire Tells How. Write: Elektra, Dept. PM10, 739 Union Avenue, Lyndhurst, NJ 07071

**900+ MLM PROGRAMS!** What's best? 3 just Selected-Leading MLM Analyst in North America. SSMP, 8 Oles, Brownsburg, Indiana 46112

**RECYCLE METALS. NO, NOT BEER CANS!** \$25,000 plus yearly. Free Information. Recycler, Box 1657, Brenham, TX 77833.

**EXCELLENT** Earnings as Real Estate Paper Dealer. Details Free. TPR Associates, P.O. Box 1318, Norfolk, VA 23502

**YOU** Can Make Money Wholesaling. Free Details. Brokerage, 109D Circle, Burns, Tenn. 37029

**\$1000+ Month—\$2.00** Brings Information Cassette and Details. 515 Greenwood Dr., Albany, GA. 31707

**\$40,000 ON 1/2 ACRE!** New Hydroponics Inexpensive, Pleasant, Practical. Free Information. Robin's, Box 1657, Brenham, TX, 77833

**FANTASTIC** Home Operated Mail Order Food Business. \$2.00 [postage/handling] Brings samples information. TSM, 4975C Plover, St. Louis, MO 63120

**BIG** Home Profits Now Yours. Spare Time in Booming Book Business by Mail. Revealing New Report Shows How. Only \$2 From: S F Distributing, 2242 Lombard, Box 104 B-1 San Francisco, CA 94123

**"HOW to Start Your Own Mail-Order Business."** Successful Methods Revealed. **"FREE"** Details. LANTZ, Route 5, Box 159-PM10, Van Wert, Ohio 45891

**NEW REVOLUTIONARY HIGH INCOME BUSINESS** at Home. **FISHING INDUSTRY** needs traps. Send \$5.00 For Information. 8HD, P.O. Box 317, Pineland, Fla. 33945

**START A PART-TIME BUSINESS FOR UNDER \$1000** **TIDY CAR OFFERS:** Superior products and processes: paint, rust, upholstery and theft protection; sunroofs and more. Write: Tidy Car Inc., Dept. PMC, 3918 Broadway, Cheektowaga, NY 14227

**IMMEDIATE PROFITS!** Spare Time. Unique Proven Enterprise. No experience or capital. Free details. No Obligation. Wealthbuilder, P 104, P.O. Box 848, Clewiston, FL 33440

**MAKE BIG MONEY REPAIRING WINDSHIELDS** and Plate Glass! Earn up to \$50,000 yearly. Send for Valuable Free Report. Glas-Weld Systems, P.O. Box 5755D, Bend, OR 97708. 503-388-1156

**HOME WHOLESALING BUSINESS!** Everything you need! Jewelry, Porcelains, Brassware, Gifts. 2000+ Products. Wholesalers, P 101, P.O. Box 848, Clewiston, FL 33440

**\$92.00** From Square Foot Plywood. (Huge Demand). Revealing Proof 25c. (Refundable). Woodwin, Bridgewater, Mass 02324

**YOU** Can Make Hundreds Daily Wholesaling. Free Details. Specialty's, P 103, P.O. Box 848, Clewiston, FL 33440

**\$480** Weekly. Home mailing program. Goodworld, Box 26233-R, Tamarac, Florida 33320

**NEW** Luxury Car without cost! Write: AMCO 9, 1601 Main, Plainfield, IN 46168

**DISTRIBUTORS, EARN SEVERAL TIMES YOUR COST** ON THOUSANDS OF PRODUCTS! GIFTS, NOVELTIES, TOYS, OTHERS. **FREE INFORMATION.** TUDOR HOUSE GIFTS, P 102, P.O. BOX 848, CLEWISTON, FL 33440

**ALTERATOR/STARTER** Rebuilding Made Easy Start Without Capital. ADM, Box 33, Buffalo, N.Y. 14207

**BUILD** Your Own Financial Empire With This **INCREDIBLE** New System. Scientific Proof! Free Information. Starmac, 323 Franklin #804-S303-B, Chicago, 60606-7096.

**FREE MONEY-** Be completely satisfied with this proven Money System or get \$10 free! **GUARANTEED!** Bar K Publications, 720 22nd Ave., Sheldon, IA. 51201

**HOW** To Get Rich In Mailorder . . . \$\$\$\$ Spare Time, Makes Mailorder Fortune . . . \$\$\$\$ Advanced, 323 Franklin #804-A209-B, Chicago, 60606-7095.

**FANTASTIC MONEYMAKER!** \$2,000 WEEKLY for Life. No Investment. Not Mailorder. JADE, Box 193, Seaside Heights, New Jersey 08751

**FREE** 3185 Unknown, Unparalleled, Unbelievable, Second Inflation-Proof Enterprises. True Case Histories. Live Life Leisurely. Unusual Free Freedom Facts. Write: Unheard Side-Businesses, 658 Park Avenue, Dept. 07-B-10, Cranston, Rhode Island 02910.

**QUICK** Cash with your Camera Rush \$2.00. REBCO, 516 Midland Park, Stone Mountain, CA 30087

**"THE DREAMER"** - The Hottest Monthly Get Rich Quick Newsletter Available Anywhere, Latest Issue only \$2.00. Dreamer, Dept. M10, Box 50681, Nashville, TN 37205

**14K** Gold, Sterling Silver Jewelry. Make 300% Profit. Catalog \$1.00 (Refundable). Couricco, 1634 Bogart, Bronx, NY 10462

**SUCCESSFUL** Mailorder Business! Simple, Effective Mail-order Start Up and Operating Instructions. Fabulous Opportunities. Guaranteed \$5. AGP, 2170P Roberts Dr., Niagara Falls, N.Y. 14304

**"THE** Association of Small Importers provides world wide Export/Import contacts. Send \$1 and SASE for sample newsletter. 1313 West Packard Av., Ft. Wayne, IN. 46807."

**TREMENDOUS PROFITS!** Small Investment! Complete Multilevel Program! Free Details. Evans, 1350 River Road, Binghamton, N.Y. 13901

**WANTED!** People —People—Who Want More Income. Details \$2.00. Madge Metcalf, 12729 Lima, Houston, Texas 77099

**HUGE** Profits in Specialty Merchandising. Catalog of over 2500 items. Send \$2.00. Refundable on first order. Rick Allen Company, P.O. Box 531, Dept. PM2, Holland, MI 49423

**LARGE** profits in mail order Free Details. RE Brown, 1314 Souza Rd #3, Los Banos, Calif. 93635

**THE SWISS-GERMANS-EUROPEANS** . . . Have Millions to Purchase . . . Invest! Free Details! Investor Report-PM, 935 Main, Vidor, TX 77662

**MILLION DOLLAR POTENTIAL** Established Fireplace Business Since 1956. Registered Nationally good deal-right party. Lee, 17655 Davenport, Dallas, Texas 75252

**FREE INFORMATION.** How To Repair ANY Sewing Machine. **SECRET** Manual Finally Revealed. S.M. Publishers, P.O. Box 968, Chattanooga, Tenn. 37401

**STAY HOME** Make some good, fast money. Thousands do. Henry Farr, Applehurst, Stockton Springs, ME. 04981

(Continued on next page)



## BUSINESS OPPORTUNITIES

(Continued from preceding page)

**DOLLARS, INSTALLING CABINETS.** Manual tells all. \$10.00! Free details. Chandler Vail, P.O. Box 337, Lake Monroe, Florida 32747

**I MADE \$40,000 Year by Mailorder!** Helped others make money! Details 25c. Torrey, Box 318YY, Ypsilanti, Michigan 48197.

**SELL Books By Mail.** Dealership-25c. Midwest, Box 44R2-PM, Shawano, Wis. 54166

**LARGE RUBBER MOLDS** for Plaster Animals. Send \$5.00 Refundable to: Florida Mold, Box 3488, Jacksonville, Florida 32206

**GET RICH** using OTHER PEOPLE'S MONEY!! Unique -- amazing business!! Details FREE!! Finance Consultants, 5B-10, Billings, NY 12510

**MAIL ORDER FACTS** Gold Mine or Dry P.O. Box, Details \$3.00. Facts, R4, Box 212, Kokomo, IN 46902

**CLIP newspaper items** -- \$2 - \$25 EACH!! FREE Report! Clippings-KB-10, Billings, NY 12510

**GET RICH!!** Secret Law smashes debts--brings cash and credit!! Details FREE!! WealthKit-WB-10, Billings, NY 12510

**HUNDREDS** Weekly Possible For Ten Hour Work Week!! Guaranteed Home Business . . . Start Immediately!! Free Information - AHV, Box 102B-A10, Kalaheo, Hawaii 96741

**LEARN** The secrets of repairing junk batteries "Fabulous Profits." **FIRST ESTABLISHED COURSE.** Apex Engineering, 5454 Bolsa, Atascadero, Calif. 93422

**REPAIR** Hydraulic Equipment--Big Profits!--Hydraulic Training Institute, 2840 Greeley, PM10, Erie, PA. 16506

**MONEY SECRETS!** Help People and businesses get money. Easy home business. Fantastic Profits. No Experience--Own Hours. Continuous Assistance. Free Details: DFC, Dept. 10-G-10, 1145 Reservoir Avenue, Cranston, Rhode Island, 02920

**CONCRETE** Block Machines: Catalog \$1.00. Route One, Box 3740, Rapid City, South Dakota 57701-3740

**ARAB BUSINESSMEN** Have Money to Buy & Invest. Top Finders Fees Paid. Int. MiddleEast Assoc., 1083PM1, 8291 Flaxman, Huntington Beach, CA 92646

**REPAIR HYDRAULIC JACKS -- DETAILS FREE.** WRITE: HYDRAULIC PARTS SUPPLY, BOX 4157, BROWNSVILLE, TEXAS 77520.

**MAKE MILLIONS MANUFACTURING** Batteries. Supplies Available. Everlast, Box 385, Bogota, NJ 07603.

**\$1,000** Weekly Home Business Directory. Box 2019-PM, New York, New York 10163.

**NEW** Mercedes-Benz, \$111.72 Monthly, or BMW, \$74.35 . . . Guaranteed . . . Write: FoxCo, Box 2655-10, Springfield, VA 22152

**BEAUTIFUL BATHTUB RE-GLAZING** dealerships available coast-to-coast. Minimum investment, \$4,900.00. Excellent opportunity. Call toll-free 1-800-235-6557. Unique Coatings Corp., 26620 Grand River, Redford, MI 48240

**MAKE \$100 A DAY** Selling Greeting Cards to Stores. No Experience. No Investment. No Deliveries. No Collections. FREE Information and sample cards. Moderne, Dept. 1014, 3855 N. Lincoln, Chicago, IL 60613

**GET OUT OF DEBT! BECOME RICH!** Secret Law wipes out debts Brings CREDIT--CASH! FREE Details. DEBTKIT--Box 168-A-7, Grove City, PA 16127

**EARN BIG MONEY** Start your own business. Amazing New Book gives Details of Finance, Marketing, plus 100 Examples. Low Capital. Send \$3.95 Postpaid. Whitley Co., 1626 N. Wilcox, Dept. 280, Hollywood, CA 90028. Moneyback Guarantee.

**OUT OF WORK? NEED MONEY?** \$1.00 booklet shows you how to start your own business through classified advertising. Popular Mechanics, Dept. KC, 224 W. 57th St., New York, NY 10019.

## MONEYMAKING OPPORTUNITIES

**DOUBLE** Your Income Through **BRAND NEW** Multi-Level Money-making Program. Write To: Kae Angelique Enterprise, 4455 Torrance Blvd., #241, Torrance, CA 90503

**FREE** Catalog. (Mail Order) Money-making Books. Youngers Books, Dept. PM10, Princeton, Iowa 52768

**UNIQUE** profitable growth oriented home business. Free details. New Horizons Enterprises, 603 Yale Drive, PM1083, Elizabethtown, KY 42701

**NEWLY INVENTED PRODUCTS** Available! Million Dollars Profits Guaranteed. Distributorship/Mail Order, Information/ Brochure; Send \$2.00 (Refundable): M'Udofot, Box 9733, Minneapolis, MN 55440

**DO YOU** Need Money? Free Information William Stack, Scituate, Mass 02066

**AGENTS WANTED NOW. MONEYMAKING OPPORTUNITY START IMMEDIATELY.** Details. Send \$1.00. A. Holt Associates, 2165 E. 97th St., Chicago, Ill. 60617

**\$500.00 WEEKLY** Recycling Discarded Tires. (Stamp Appreciated). LeValleys, Fountain, FL 32438

**SPARE** time fortune in Vinyl Repair. Huge demand creates exceptional profits. We supply everything. Details free. VIP, 2062 Montrose, Chicago, 60618

**FANTASTIC** earnings mailing from home!! Offer: Rush Stamped Addressed Envelope. Imperial, P-8 X17410, Fort Lauderdale, FL 33318

**700,000 BARGAINS.** Mail Order, Home Businesses, Imports. Free Details: American Money-makers, Box 8356PM, Tampa, FL 33674

**BUMPER STICKER PRINTING DEVICE.** Cheap, Simple, Portable. Free details. Bumper, POB 22791 (GH), Tampa, FL 33622.

**MONEY** from discarded tires! Details. Brownie, Box 53, Fishers, Indiana 46038.

**EARN \$\$\$** build your own saw sharpening machine. Free information. Sharp-eze, PO Box 6004, San Bernardino, CA 92412

**MEGABUCKS!** Easy-to-follow "Blueprint to affluence" that can make you wealthy! FREE details. Jailam, PM10, 4127 Bay St., Fremont, CA 94538

**FANTASTIC!** How To Start And Operate Your Own Business At Home. Free Details. W.E. Kelly, 1184 S. St. S.W., Moultrie, Georgia 31766

**MAKE PVC PIPE FURNITURE.** \$30,000 year, spare time! Easy. Free Information. Owen, 771PF, Battle Ground, Washington 98604

**BIG** Profits! Miracle Product! Free Details: Walker Enterprises, Box 371077-PM2, Decatur, Georgia 30037

**EXTRA CASH--** You can earn it! Your FREE subscription to Opportunity Magazine shows you how with success stories of today's entrepreneurs. Write: Opportunity, Dept. 993, 6 N. Michigan, Chicago, 60602.

**SECRETS** of the Richest People. Free Details. Wayne Westlake, Kiana, Alaska 99749

**MAKE THOUSANDS** At Home Distributing Fast-Moving Products By Mail. BIG Money. Easy Work. Details: \$2.00 (Refundable). Mastermind-M, Box 753, Bountiful, Utah 84010

**EASY MONEY!!** Exciting Home Business. Full Part Time. Free Details. Quality Books, 1524 Elliott, 10M, Park Ridge, IL 60068

**WIN BIG MONEY AT BLACKJACK--**Free Information--PROGAMBLE, 2885 Paces Lake, Atlanta, GA 30339

**BECOME** a millionaire using our money--Free! Jadco, Box 363, San Pedro, CA 90731.

**CAPITALIZE** on your knowledge! Learn "HOW TO IMPORT, CONVERT, LEGALIZE YOUR INVESTMENT AUTOMOBILE"! Create own dealer's profits! This \$30 write-off guides through complete procedures. Order through: HIT Publications, P.O. Box 11138, Costa Mesa, California 92627

**YOU** can become RICH, HAPPY, HEALTHY. Free details. Worthingtons, 4310 Lomas NE PM10, Albuquerque, N. M. 87110

**\$25,000** Possible Investing \$40 in Little Known Government Program. FREE Details Explain How. Documentary Research, GP1, Box 26245, Milwaukee, WI 53226.

**SUCCESSFUL** Home Business(es); Minimal Capital. Free Information; Self-Addressed, Stamped Envelope. Outreach Unlimited, Department 14, 6211 Stoneham, Bethesda, MD 20817

**\$3,900 A MONTH SELLING YOUR GROCERY RECEIPTS.** Simple Legitimate. Let Me Show You. Details FREE. Associates, 413PM Grover St., Shelby, NC 28150

**EXTRA MONEY--** Report Shows How To Turn A Hobby Into Money Making Venture \$2.50. Write To: Whimsy, 386 Moon Road, Lake Orion, Mich. 48035

**EARN A FORTUNE** With Your Hobby Or Interest. Details: Lusk Associates, 80-10PM Overbrook, Asheville, N.C. 28805

**UNLIMITED MONEYMAKING, NEW AGE FOODS,** Details \$2.00. Robinson's, 745 Blue Hills Ave., Bloomfield, Conn. 06002.

**HOW** To Create Your Successful Plan For More Money! Millionaire Reveals Secrets. United Distributors, Box 801AA, Mangum, Oklahoma 73554

**FREE** Catalog!! 150+ \$-Saving, \$-Making Reports. Loven, 815 Monroe, Scranton, PA 18510

**FREE** Details. How to become Part of the **MOST PROFITABLE** Home Based Business Today. Jordan Enterprises, Box 3068, Lawrence, Kansas 66044

**ABSOLUTE GROUND FLOOR OPPORTUNITY--** **STARTED JULY 9.** Multi-Level Marketing of Food. Be in From the Start. (203) 658-9707. TNBG, Box 441, Simsbury, Conn. 06070

**WIN** Million Dollars Prize Money Weekly. Free Information. Eby, 323 Franklin, Suite 804-E-36, Chicago, IL 60606

**101** Money-making businesses you can easily start now! Details. Jener, Box 31146, P10, Honolulu, HI 96820.

**1984 OLYMPIC** Collectables Sales Kit \$19.95 Lighting Sellers Act Fast. Some Merchandise Limited. Entrepreneur's, 2115 W. Manchester, Los Angeles, CA 90047

**200%** Profit Selling Jewelry, 14-Karat Gold, Cubic Zirconia, Genuine Stones; 300% Selling Carded Items; To 150% On Cutlery, Cameras, Telephones, Radios. Send \$5.00 For Kit. Refundable On First Order. Heard, 57 Harris Avenue, Freeport, N.Y. 11520

**STOCK** Market- Big Profits for Beginners or Experienced Investors. Proven Method. \$3.95. Mailsmith, 11 South Marshall Street, Albany, New York, 12209

**MAKE MONEY** How To Import Products. Guaranteed or Money Back. Send \$3.25 for Pamphlet To: Ideal Products Co., P.O. Box 490PM, Lake Oswego, Oregon 97034

**NEW** Luxury Car Without Cost Write: AMCO 9E, 1601 Main, Plainfield, IN 46168

**FORECLOSURES--** Buy Bargain Properties Risk-Free. Techniques. \$5.75. Kelsey, P.O. Box 3295GS, Springfield, Missouri 65808

**WIN** Contests! "Inside" Information you need to Win! Send \$3.00. Amron, Box 5213, Arlington, Texas 76011

**6 EASY** Ways To Earn Money Spare Time Unconditional Guarantee, Name Address \$3.95. Rann Enterprises, 1260 Old Oak Circle, Birmingham, Alabama 35235

**START** Your Own Profitable Business At Home Spare Time. No Personal Selling. Write Today. Avant Publishing Co., P.O. Box 11012, San Francisco, CA 94101

**HOW** to Start World's Easiest Business! Exciting. Free Information -- Research Center, Box 23657PM1, Phoenix, Arizona 85063

**IDEAS** CAN MAKE YOU RICH. 31 proven, low-cost profit makers. Collected by nationally syndicated columnist. Send SASE and \$2.00 to: Ideas, Box 4994, Des Moines, Iowa 50306.

**WE BUY NEWSPAPER CLIPPINGS.** Registration--SASE, \$1.00. REJOICE, 8855 Atlanta, #307A Huntington Beach, CA 92646

**MAIL** Catalogs To Our Customers From Home. Earnings Unlimited! RBM Merchandising, P.O. Box 59314, Chicago, IL 60659.

**DIRECTORY** of American Importers. Lists Hundreds of Importers, Thousands of Products Wholesale. Invaluable for Flea Markets, fundraising, etc. **MAKE** money. **SAVE** Money. Only \$3.50. Guaranteed. Martin Gifts, Information Division, 121 Haller Road, Ridley Park, PA 19078

**ACHIEVE** Financial Independence In The 80's! Exciting Risk Free Offer Shows How. RWS, 8951 Albatross Drive, Huntington Beach, CA. 92646

**GET RICH!!** Secret law smashes debts -- brings Cash, Credit! FREE report!! WealthKit-WBM-10, Billings, NY 12510

**\$10,000 A Month** and a Free Cadillac! Could you live on that? For Details send \$1.00 refundable. K.H. Willenberg, Box 2482PM, Huntington Beach, CA 92647-0462

**SELL NEWSPAPER CLIPPINGS** \$2.00 to \$25.00 Each. Send for Free Report! CLIP-IT, Box 168-A-7, Grove City, PA 16127

## RABBITS-CHINCHILLAS-FUR BEARING ANIMALS

**AMAZING** Profits! \$10,000 Yearly Raising Rabbits for Wool and Breeding. Details--\$2.00. American Angora, Malta 12, Montana 59538.

**RAISE RABBITS SUCCESSFULLY** 68 Page Booklet Tells How. \$1.00. American Rabbit Assn., H1, P.O. Box 426, Bloomington, Illinois 61701

**GUARANTEED** Income. \$10.00 (refundable) for literature. Chinchillas, Box 8294, Mesa, Arizona 85204.

**\$500-\$1000** Month Plan raising rabbits for us. Free details. White's Rabbitry, Box 1388PM, Hudson, Ohio 44236

## EARTHWORMS, LIVE BAIT

**FREE** Literature. Raise Fishworms, Crickets, Redworms--1000-\$8.95, 5000-\$42.50. Book on How and Where to Sell with Order. Canter Fishworms, Plains, GA. 31760.

## OF INTEREST TO ALL

**12V REFRIGERATION SURPLUS** Compressors \$19 ppd. Euro-Systems, P.O. Box 2138, Key Largo, FL 33037

**SONG FOR THE UNSUNG SOLDIERS.** 45 rpm Record honors Vietnam veterans. \$2.00. PLAIN FOLK, Box 235, Big Rapids, MI 49307

**FREE** Promotional Albums, Concert Tickets, Stereos, etc. Information: Barry Publications, 477 82nd Street, Brooklyn, NY 11209

(Continued on next page)



## OF INTEREST TO ALL (Continued from preceding page)

**VACUUM Cleaners "Discount Prices"** "New" Rainbow \$349.95, Kirby, Filter Queen, Compact, Details: ABC Vacuum Warehouse, 7021 Burnet - PM, Austin, Texas 78757

**DISNEY** artist shows you how to draw. First easy lesson **FREE!** Get started today! Bruce McIntyre-PM20, 3471 Crownsworth, Corona, CA 91720. (714) 953-7452.

**FREE GIFT** sent with inquiry on **PERSONALIZED STAMPING PENS!** Details \$2.00, credited toward purchase. MillMark, Dept. A-10, 120 Cypress Street, Millburn, New Jersey 07041.

**WWII** aircraft pictures with data, any country, \$3.00 each: Veegee Varieties, Box 1203, Santa Maria, California 93456.

**JOIN "Let's Trade."** (Barter) Call 1-800-327-0560 Extension 1509. Write: Box 152P, Miami Springs, FL 33266. Membership \$10 monthly. Details, \$1.

**STOP RUST!** New liquid rust remover. Leaves protective coating. Safe, nontoxic, nonacid. No sanding! Easy to apply. **REUSABLE.** Introductory offer: 16oz-\$10.00 ppd. **FREE** gift with order. Money-back guarantee! Other sizes available. Details free: House of **MERLIN** Enterprises, 401 5th Ave., Dept. PM10, East Northport, NY 11731

**COUNTERFEIT MONEY** Easily Detected with Pocketsize Electronic Device . . . **ABSOLUTELY** Rejects Bogus Bills **INSTANTLY.** Only \$23.99ppd. Refund Guaranteed. Dealer Inquiries Invited. Northeast Brokerage, P.O. Box 30228, Jamaica, New York, 11430

**WIN TOP JOBS** - Interview Secrets Revealed - Free Details - Magister, Box 13646, Tallahassee, Florida 32317

**THE SILENCER!** Attaches to Standard Phone. Flick of a Switch Keeps Phone from Ringing. Callers Hear It. You Don't! Moneyback Guarantee. \$5.98. Enderby Fields, 4825 East Upland Crest, Columbia Heights, Minnesota 55421

**SUCCESS ASSURED WITH PSYCHOFEEBACK.** Free booklet. Psychofeedback, Box 49454P1, Los Angeles, CA 90049

**CREDIT SECRETS.** Get MasterCard, others, without investigation. Legally discharge debts, protect assets, restore credit. Loans. Guaranteed. Details: Inflation Reports, PMP, Box 60148, Los Angeles, CA. 90060. Dealers wanted.

**FREE CATALOG!** Privacy, Credit, Divorce, Employment, Tax Problems? Our books have the solutions. Write to: Eden Press, 11623 Slater, Box 8410-PG, Fountain Valley, CA 92708.

## WOMEN'S INTERESTS

**"PINCUSHIONS"** UNIQUE GIFT Ideas, fillings, patterns. \$3.95ppd. Box 26675, Lakewood, CO. 80226

## GOVERNMENT SURPLUS

**IS IT True You Can Buy Jeeps For \$44 Through The U.S. Government?** Get The Facts Today! Call (312) 742-1142 Ext. 7133.

**1983** Surplus Army, Navy store 64 pages illustrated catalog. Send \$2.00. Ruval, 3037 N. Clark, Dept. J-10, Chicago, IL 60657.

**JEEPS-MOTORCYCLES-AIRCRAFT-AUTOMOBILES** . . . Government Surplus Directory - Moneyback Guarantee - How, Where - \$2.00. GS Information, Department 110, Box 3913, Springfield, Massachusetts 01101

**GOVERNMENT SURPLUS!** 950,000 items (including Jeeps) . . . low as 1¢ on dollar! Most complete Directory available. \$2.00. **DISPOSAL**, Box 19107-AJ, WASHINGTON, DC 20036.

**WANT A \$44 JEEP? LAND FOR \$7 AN ACRE?** Cheap houses? Boats? Call for Directory, Guide and Newsletter. (916) 722-1111 Ext. JeepsPM

**JEeps-LAND** - Low Low Prices! Millions of Items! Government Surplus. Directory on How and Where. \$2.00. Vellans, P.O. Box 1082, Lynnwood, WA 98036

**"GOVERNMENT SURPLUS"** JEeps \$30.00! 800,000 Items! Complete Information Your Area. **LARGEST OFFICIAL DIRECTORY.** \$2.00 (Guaranteed). **SURPLUS**, (A559), 4620 Wisconsin Northwest, WASHINGTON, D.C. 20016

**GOVERNMENT SURPLUS** - Report Gives Money Making Tips. Complete Surplus Depot Directory. \$2.50 Satisfaction Guaranteed. **ARTHUR ENTERPRISES**, 45-10 Utopia Pkwy, Flushing, New York 11358

**GOVERNMENT SURPLUS . . . JEeps-AUTOMOBILES** - \$30.00! 900,000 Items! Complete Information - Your Area. **GUARANTEED DIRECTORY** - \$2.00. **EASTERN DISPOSAL**, Box 392MS, VALLEY FORGE, PENNSYLVANIA 19481

**GET** on the Government Surplus Bidders List, Guarantee. Send \$2.00 to: JB Hunt, P.O. Box 2677, Anderson, IN. 46018

## LOANS BY MAIL

**LOANSS ON SIGNATURE TO** - \$100,000! Any purpose. Write: Elite, Box 206 - P, East Rockaway, New York 11518.

**BORROW** \$25,000 "overnight." Any Purpose. Keep indefinitely! Free Report! Success Research, Box 19739-AX, Indianapolis, Indiana 46219.

**MONEY Problems?** Free Book describes Loans, Cash, Government Grants, Other benefits, available to individuals. Write: Associates, Box 98-A4, Brooklyn, New York 11235

**BORROW** \$500.00 - \$500,000 Cash, Immediate Processing, Confidential, Send Stamped Envelope. FB&T, Box 532894P, Grand Prairie, Texas 75050

**BORROW** \$100-\$100,000! Instant Reply! No Co-signers! Rush Stamped Envelope! Financial, Box 5487(P), Richardson, TX 75080

**CASH** Loans-Borrow by Mail \$500.00 to \$25,000! Free details, Application! LTD-PM, Box 937, Ft. Lauderdale, FL 33302

**BORROW** \$30,000 without interest! All eligible. Repay anytime. Free details! Infohouse-508PM, 533 Sutter, San Francisco, CA 94102.

**CASH** Loans-Borrow By Mail. \$250 To \$25,000. Free Details, Application. Moneymasters, D-106, Box 337, Aberdeen, N.C. 28315.

**BORROW FROM HOME!** Any amount, any worthwhile purpose, within 30 days. Competitive Rates. Also, you can earn substantial income as a Money Agent. No Experience—Own Hours. National Company to assist every way possible. No Gimmicks! Free Details: DFC, Dept. 10-C-10, 1145 Reservoir Avenue, Cranston, Rhode Island 02920

**BARCLAYSAMERICAN/LOANS BY MAIL** Loans by Mail to \$10,000. Convenient, Confidential, No Collateral, P.O. Box 5425, Alexandria, LA 71301. Toll Free 800-551-6572. Not Available in AL, AR, CA, DC, FL, IA, IN, KS, ME, MD, MA, MI, NM, NY, OH, OK, OR, SC, SD, TX, WA, WI.

## PERSONAL

**AFRAID** of Getting Fired/Laid Off? We can Help you Start Spare Time Business. Details: Jolyn, 290 Main St., Ste. 900-PM4, Buffalo, NY 14202

**COLLEGE DEGREES BY MAIL.** Renowned Universities offer fully-accredited Bachelors, Masters, Ph.D.s... Free revealing details. Counseling, Box 317-MP10, Tustin, California 92680.

**BIBLE** Questions answered. Stamped envelope. Bylon, 17167 Bentler, Detroit, Michigan 48019

**MAKE** Friends worldwide through international correspondence. Details free! Hermes-Verlag, Box 110660 PM, Berlin 11, W. Germany

**SINGLE'S** Guide to Home Buying, \$6; Change Your Life Through Dreams \$4.50. Free information. Penguins, 137 Belts, St. Paul, MN 55106

**FINANCE YOUR DREAMS** with Government and Foundation Grants. Free Details. TOU-PM10, 432 PCH, Hermosa Beach, California 90254.

**BORROW** By Mail! Free Details! MBG-PM1083, Box 2298, Sandusky, OH. 44870.

**ASIAN**, European Friendship! Free Details: Inter-Pacific, Box 304PM, Birmingham, Michigan 48012.

**UNIVERSITY DEGREES BY SPECIAL EVALUATION** of EXISTING Job Experience, Education, Achievement. Fast, Inexpensive, Call (614-863-1791). Or Write: Box 13151-T10, Columbus, OH 43213

## REMAILING SERVICE

**WISCONSIN** Or Illinois Postmark, Please Specify-Confidential-\$1.00 Per Letter, SASE To: P.O. Box 323, Antioch, Ill. 60002

**REMAILING** 20¢. Forwarding \$18.00 yearly. "Economaif", Box 541, Ephrata, Washington 98823

**UNLISTED ADDRESS.** Discreet and confidential. Remail \$1.00 Single, Mail Forwarding Service, 8050 S. Main, Houston, Texas 77025

**DEPENDABLE** Remails, Messages, Saves Money. Central, Box 504, North East, MD. 21901

**HOLLYWOOD, CALIFORNIA** Remails. \$1.00 Each. Henderson, Box 48052, Los Angeles, CA 90048.

**PRIVATE** Address. Dependable. Professional Mail Forwarding, Box 561A, Milton, Mass. 02186

**CONFIDENTIAL** Mail Receiving/Forwarding. Mail Drop, Box 18039PM, Orlando, FL 32860

## MISCELLANEOUS

**COLLEGIATE** research catalog—306 pages—15,278 topics! Rush \$2.00. **RESEARCH**, 11322 Idaho, #206PK, Los Angeles, 90025. (213) 477-8226.

**PHOTO ID.** Sealed in plastic. Good in all States. Provinces. Fast. **GUARANTEED.** Send \$6.00 (2/\$10.00). Photo, Name, Address, Height, Weight, Hair, Eyes, Birthdate, Cardinal Publishing, 2071-46 Emerson, Jacksonville, Florida 32207.

**VEGAS** Quality Poker Chips Personally Monogrammed Send \$2.25 for Brochure (Deductible from order). The Poker Store, 9061 Bolsa Ave., Suite 203, Westminster, CA. 92683

**ORNAMENTAL** Iron Designs. Book of 1600 beautiful practical designs for railings, columns, etc. Free Literature. Cunningham, Box 20005, Salt Lake City, Utah 84120-0005 — (3861 South 3200 West)

**PHOTO IDENTIFICATION CARDS . . . GUARANTEED!!** Samples 25¢ . . . Bascoo, Box 3461-PM-83, Providence, R.I. 02909.

**TWO LINE STUNT KITE.** You control kite through spectacular maneuvers. High performance. Exhilarating to fly. \$22.00 ppd complete with lines and handles. Flight, Dept PM, Box 37169, Albuquerque, NM, 87176.

**FLATBED TRAILER PLANS,** Complete, Detailed. Catalog \$1.00. Valley View Welding, Box 5238A, Helena, Montana 59604

## WANTED MISCELLANEOUS

**GOLD,** Silver, Platinum, Mercury, Tantalum. Samples evaluated free. One assaying service. Call Wholesale Terminal toll free: 1-800-932-1010.

**BUYING** Tungston Carbide, 800-321-6914, Ohio 216-449-2828.

**SCRAP SILVER CONTACTS, FORKLIFT CONTACTS,** Silver Solder, Sterling, Gold Plated. Robert Leszczak, 652 Myrtle St., Elizabeth, NJ 07202

**STEREOVIEWS! DAGUERREOTYPES! CAMERAS!** Norton, Box 1070PM, New Haven, Connecticut 06504-1070 (203) 562-7800

## FOR SALE MISCELLANEOUS

**SILVER FORK-TRUCK CONTACTS AND SILVER Solder** CHEAP. Robert Leszczak, 652 Myrtle St., Elizabeth, NJ 07202

## HEARING AIDS

**HUGE SAVINGS** Eliminate Dealer Markups. Free Trial. Batteries Wholesale. Terms Arranged. Call Toll Free 1-800-323-1212. Or Write: Lloyds-PMC, Rockford, IL 61110

**SAVE \$200.** Name Brands. No Salesmen. Free Catalog. Dept. 132-U. J. & M, 329 N. 3rd, DeKalb, IL 60115

**MAIL ORDER** buying saves half on hearing aids. Month's trial. Res Company Inc., Box 364, Bridgeport, OH 43912

**FREE HEARING AID CATALOG** - Save 1/2 by mail! Write: "MoneySavers", 9530-PM-10, Langdon, Sepulveda, California 91343. Not sold in California.

**FREE** Hearing Aid catalog. All-in-the-ear and other models. Huge savings. Batteries too. No salesman. Rhodes, Dept. 135-R, Brookport, Illinois 62910

## TOBACCO

**BRIAR PIPE** Make or repair your own. Photocopy of article shows you all the details. Send for Plan X-478-G - \$2.00 to: **POPULAR MECHANICS**, Box 1014, Radio City Sta., New York, N.Y. 10101

## SCIENCE & CHEMISTRY

**LABORATORY** Chemicals, Glassware—Apparatus, Catalogue \$1.00. Deluxe Scientific, 934 S. 13 Street, Manitowoc, Wisconsin 54220

## FORMULAS, PLANS, ETC.

**150 MONEYMAKING FORMULAS.** Free Information. Frontier-A, Box 44179, Tucson, Arizona 85733.

**MONEYMAKING CHEMICAL FORMULAS — THOUSANDS! CATALOG \$3.00 (REFUNDABLE):** GWA3, Box 193, Brookfield, Wisconsin 53005-0193

**ANY FORMULA** \$10.00. Catalog \$1.00. J. Belfort, Box 568, Chicago, 60690

## GENEALOGY

**AMERICAN GENEALOGY:** A comprehensive, 16-lesson home study course for amateur and experienced researchers seeking to upgrade their knowledge and skills. National Genealogical Society, 1921PM Sunderland Place NW, Washington, DC 20038.

## SPECIAL SERVICES

**INFORMATION** On anything. Ferguson Research Specialists, 60-15 Woodside, Woodside, New York 11377.

**WHEELCHAIR** Arms of Hardwood Dress Up Your Chair. Woodchuck, P.O. Box 23, Amesbury, MA. 01913

**FIREPLACE PROBLEM?????** Problem Fireplace, Fireplace Master, 30 years experience. \$10.00 per Question. SASE. Thomas Gaddie, 17655 Davenport, Dallas, Texas 75252

## HEALTH, VITAMINS

**HOW TO STAY WELL:** 365 Day Guide - **NUTRITION • DIET • EXERCISE • HEALTH • WELL-BEING** \$5.95. Money back guarantee. **ORDER TODAY: UFFA-DA CAL**, Box 636-PM, Black River Falls, WI 54615

**NEGATIVE** Ionizers 110-12-7000V \$49.90ppd!! Allergy, Ionization, Vision. Wiring information \$1.00!! Discounts! 3045(PM5) Troy, Chicago, 60618—312/478-9526



# Popular Mechanics

224 West 57th Street, New York, N.Y. 10019  
Classified Advertising Dept. (212) 262-4825

Order  
Form

**DEADLINE FOR ADS:** Copy and Payment must be in by the 5th day of the 2nd preceding month for the issue in which the ad is to appear. See Head of Classified Section.

**HOW TO COUNT WORDS:** Name and address must be included in counting the number of Words in your ad. Each initial or number used counts as 1 word: J.J. Smith, 224 West 57th Street, New York, New York 10019: 9 WORDS. Zip codes are not counted. Phone #: 2 Words. Symbols used as keys are charged for. City or State count as 1 word each: New Brunswick, New Jersey: 2 words. Abbreviations such as C.O.D., F.O.B., R.P.M., U.S.A., P.O., 5x7, 16mm are counted as 1 word. (P.O.Box 392 counted as 3 words) Webster's International Unabridged Dictionary will be used as our authority for spelling, compound words, Hyphenations, abbreviations, etc. Please make checks payable to **POPULAR MECHANICS**.

Only \$57.00 for 10 word minimum

\$5.70 each additional word

**BOLD FACE CAPS add  
\$1 per word**

(First Word: No Charge For Bold Face)

Remittance of \$\_\_\_\_\_ is enclosed to cover \_\_\_\_\_ insertions(s) in the \_\_\_\_\_ issue(s) \_\_\_\_\_ Classification

No Charge for CAPS	2	3	4	5	6	7
8	9	10-\$57.00	11-\$62.70	12-\$68.40	13-\$74.10	14-\$79.80
15-\$85.50	16-\$91.20	17-\$96.90	18-\$102.66	19-\$108.30	20-\$114.00	21-\$119.70
22-\$125.40	23-\$131.10	24-\$136.80	25-\$142.50	26-\$148.20	27-\$153.90	28-\$159.60
29-\$165.30	30-\$171.00	31-\$176.70	32-\$182.40	33-\$188.10	34-\$193.80	35-\$199.50
36-\$205.20	37-\$210.90	38-\$216.60	39-\$222.30	40-\$228.00	41-\$233.70	42-\$239.40
43-\$245.10	44-\$250.80	45-\$256.50	46-\$262.20	47-\$267.90	48-\$273.60	49-\$279.30
50-\$285.00	51-\$290.70	52-\$296.40	53-\$302.10	54-\$307.80	55-\$313.50	56-\$319.20

YOUR NAME \_\_\_\_\_ PHONE: \_\_\_\_\_

FIRM (NAME IN AD) \_\_\_\_\_ (PLEASE PRINT)

YOUR ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

DATE: \_\_\_\_\_ YOUR SIGNATURE \_\_\_\_\_

(PLEASE PRINT OR TYPE COPY • FOR ADDITIONAL WORDS ATTACH SEPARATE SHEET)

## WORK CLOTHING

**WORK** Clothes - Save 80% Shirts, Pants, Coveralls. Free folder. Write: Galco, 4004 East 71st Street, Dept. P-10, Cleveland, Ohio 44105

## GARDENING & LAWN CARE

**KEMP SHREDDER/CHIPPERS.** Why pay for prepared garden fertilizer? Save Money. Recycle. Make your own mulch, compost with a Kemp Shredder/Chipper! Shreds, grinds, pulverizes virtually any organic matter—from leaves to garden waste—reduces 3" dia. branches in seconds. Write for Free literature. Kemp Company, Dept. 77S, 160 Koser Road, Lititz (Lancaster Co.), PA 17543.

**FREE REPORT:** "Grow a Better Garden!" . . . **FINEST IMPROVED SNOW CROCUS:** 50-\$7.25 Satisfaction Guaranteed. LIFESCI, Box 276, Waldwick, N.J. 07463

## FLOWERS, PLANTS & NURSERY SUPPLIES

**CACTUS** Grow Your Own, Fun for hobby. Box of Four \$8.00. Send to: Cactus, 14246 North 37th Way, Phoenix, Arizona 85032

**LEARN** Landscaping at home. Free booklet. Lifetime Career Schools, Dept. A-71, 2251 Barry Avenue, Los Angeles, California 90064

## RECIPES, COOKING, ETC.

**NEW** Orleans Style Red Beans and Rice \$2.00 SASE. Recipe. 3916 Briant Dr., Marrero LA. 70072

**QUICK,** easy sauces to brighten meals. \$2.75. C.E.C., 5349 Wheaton Street, La Mesa, California. 92041.

**38 DELICIOUS** Easy Recipes from 32 Countries. \$3.99. Johnson, Box 23, Friedens, PA 15541

**AS SHOWN ON TV!** Tina's Cheesy Pretzels \$2.00. Tina Good, 624 Kenwood, Dayton, OH 45406

**GYPSY** Meal \$6. **FREE,** personal handbag, weight control brochure. 1024 S. Tulip, Escondido, CA 92025

**CHEESECAKE** Lovers. New England Style \$2. Westhill Products, 287 West St., Rocky Hill, CT. 06067

**50 EASY** Chicken Recipes! \$3.50 + .60c Postage. Tuxedo Prints, Box 20014, Castro Valley, California 94546.

**SEAFOOD RECIPES FROM THE ISLANDS AND THE FLORIDA KEYS** Prepare your favorite seafoods the way island people have for years. Book of 20 recipes to enhance your seafood meals. \$3.00. Perry's House By The Sea, 62 Overseas Highway, Box 1073, Islamorada, Florida Keys 33036

**DAVID'S FAVORITE ALL NATURAL CARROT CAKE.** Superb. Simple. Delicious. Creamy frosting \$2.00. David, Box 827, Exton, PA. 19341

**INDIA** Recipes Vegetarian/Non Vegetarian \$2.00. Murtis, 460 East 79th Street, New York, NY 10021

**WARM AND TASTY-** The Wood Heat Stove Cookbook, over 200 Family Recipes and Historical Information, Great Gift, \$6.95. NSE, Box 5054, Irving, Texas 75062

**ORIGINAL** Gourmet Recipes — Giblet Turkey Dressing - Tantalizing Spaghetti Sauce - Mouth-watering Wild Rabbit - "Come Alive" Sauce for Baking Fish - "Come-Back-For-More" Barbequed Rib Sauce - "Lastingly-Good" Relish Sauce for Hot Dogs, Hamburgers, etc. All six recipes for \$10.95. Good to make all Year Round! Act Now! Market Basket, 202 Ford Street, Schenectady, NY 12306

**TRADITIONAL POLISH RECIPES.** 10 Impressive Favorites for the Holidays and Everyday. \$3.00. The Polish Kitchen, P.O. Box 2262, Glens Falls, NY 12001

**OATMEAL** Mushroom Patties, Instructions \$1.00 SASE. Box 4932, Tyler, Texas 75702

## WINEMAKING, BEERMaking, ETC.

**WINEMAKING-BEERMaking-GASCHOL.** Free Supply Catalog. Yeast Equipment. Continental, Box 188PM, Casselberry, FL 32707

**DANISH COUNTRY LIQUEURS** make your own old world fruit berry Liqueurs, 69 pages of history recipes uses, send \$6.25 to: Danish Liqueurs, P.O. Box 1422, Beaverton, Oregon 97005

**WINEMAKERS-BEERMakers—** Free Catalog—Fast Service—Large Selection: Kraus, Box 7850-L, Independence, Missouri 64053.

**FREE ENCYCLOPEDIA** Winemaking, Beermaking Supplies, Equipment, Ingredients. Vynox, P.O. Box PM15498, Rochester, NY 14615

**WINEMAKERS-BEERMakers** Fresh Stocks, Fast Service, Free Catalog. O'Brien's, Box 284D, Wayne, IL 60184

**WINEMAKERS-Beermakers:** Free Illustrated catalog of supplies. Semplax, Box 12276R, Minneapolis, Minnesota 55412-0276

**BEERMakers ONLY!** Free Catalog/Newsletter. William's, Box 461M, Oakland, California 94604.

**MAKE QUALITY BEER,** Wine. Free catalog. Village Store, Box C-51PM, Westport, MA 02790

**"HOW To Make Moonshine"** 45 pages available \$2.30. B&J Enterprises, 1845 S. 19th, Springfield, IL 62703

**HOLIDAY PARTY SUCCESS** 72 Popular Cocktail Recipes, \$4.00. Mixology, 510 Carpenter Street, Philadelphia, PA. 19147

**MAKING** Whiskey, Gin, Vodka, Alcoholuel, Illustrated Manual, \$2.00. Homebrewer, 723P Dieston, Philadelphia, PA 19111

**BEER LOVERS** — Brew your own. Delicious! Inexpensive! Free Catalog. Beer Gear, Box 25083M, Lansing, Michigan 48909

**FREE BEERMaking CATALOG.** Quality. Selection. Lowest prices anywhere. **HOME BREW,** Box 158M, Haslett, MI 48840.

**GROW GINSENG,** Very Profitable. Have seeds, roots. Goldenseal. Complete information. K. Collins, Viola, Iowa 52350

**FREE BEERMaking BOOK** Plus Catalog. Finest Equipment, Ingredients. Fully Guaranteed. SPI, Box 784-M, Chapel Hill, NC 27514

## BURGLAR ALARMS & HOME PROTECTION

**BURGLAR-FIRE ALARMS** for home, business, auto. Install yourself and save. Installation manual/catalog shows how. Shows latest equipment, accessories. Lowest prices. Send \$1.00 (refundable). **BURDEX SECURITY,** Box 82802-PMJ, Lincoln, NE 68501

**ALARM** Personal And Home Alarm Including Flash Light Shirt Pocket Size Loud Piercing Sound \$4.95. P&H \$1.50. Phillips, P.O. Box 2683, Zanesville, Ohio 43701

**KEEP BURGLARS OUT** by building your own alarm system! Complete, easy-to-follow instructions and pictures. Nearly everyone can do it. Free details. Meek Industries, Box 95021, Atlanta, GA. 30347.



# New UDS Computer Telephones To Be Sold For Only \$10 Apiece In Mammoth Publicity Drive

*All who wish to apply for a new Computer Telephone  
should write to the company address below  
before Midnight, December 25, 1983.*

NEW YORK—One million new UDS Computer Telephones with electronic memory and pushbutton dialing will be sold as part of a publicity campaign for only \$10 apiece to the first one million persons who write to the company address before Midnight, December 25, 1983.



rotary dial or pushbutton phones. *You can then legally return your present phones to the phone company, saving yourself up to \$8 a month (or over \$90 a year) for each phone you return.*

These new UDS Computer Telephones will not be sold at this price by the company in any store. To obtain one at this price, apply in writing to

the company address no later than Midnight, December 25, 1983.

Each phone carries a full one-year money-back guarantee, and the company will replace it, free of charge, if it ever fails to function. There is a limit of two (2) phones per address at this price, but requests which are mailed early enough (before Dec. 17) are permitted to order up to 5 phones.

To apply for a new UDS Computer Telephone, mail *this original printed notice* together with your name and address and \$10 for each phone desired. Add \$2 shipping and handling for each phone you are requesting. Allow up to 6 to 8 weeks for shipment. Mail to: **Abernathy & Closther, UDS Computer Telephone Offer, Dept. 114-10, Box 256, Jericho, New York 11753.**

**(A23150)**

These are the same famous UDS Computer Telephones to be nationally publicized in *The New York Times*, *TV Guide* and other leading magazines, with *electronic re-dial* (which automatically keeps re-dialing busy or unanswered numbers till they answer) and *electronic "mute"* (which lets you talk "confidentially" without putting your hand over the mouthpiece.)

Only half the size (and half the weight) of standard phones, they also have adjustable electronic ringers, which means you can turn them "off"—for complete silence—whenever you don't want to be disturbed. And when you finish your call, you don't have to bother hanging up—simply put the unit down (anywhere you please) and it will hang *itself* up, automatically.

These new UDS Computer Telephones are FCC-approved and require no installation. Simply plug them into the same modular outlets as your present





# The all-new 1984 Ford Tempo

## Style and technology in total harmony.

### Form follows function.

In its creation of Tempo, Ford set out to design a car that would prove that a spacious interior, comfort and performance could be compatible with fuel efficiency. Ford engineers began with a sound design principle: Form follows function. First came completely new functional ideas. And then Tempo's pleasing form followed—naturally.

An acknowledged world leader in aerodynamic design, Ford used this expertise in creating Tempo. And it has a profound effect on the overall performance of the car. For example, aerodynamics helps Tempo hug the road because airflow is directed to reduce lift for improved stability and directional control.

Tempo is equipped with

the world's most advanced automotive computer: the EEC-IV (Electronic Engine Control). It monitors and controls seven vital functions of Tempo's new 2300 HSC

engine for optimum power response and fuel efficiency.

Fuel economy rates high on Tempo's list of pluses. The standard FS, (Fuel Saver) powertrain with 4-speed manual transaxle is rated at 43 estimated hwy and [28] EPA estimated mpg.\*

### Pick up the Tempo of your life.

To obtain a brochure with more information on Ford's all-new sedan, see your Ford Dealer or call 1-800-772-2100.

\*For comparison and applicable only to sedans without A/C. Your mileage may differ depending on speed, distance and weather. Actual highway mileage and California ratings will probably be lower.

Get it together—Buckle up.

Have you driven a Ford... lately?



Available in 2-door and 4-door (above).

### TEMPO FEATURES

**Front-wheel drive:** All-weather traction, precise handling.

**Four-wheel independent suspension:** Responsive handling and a smooth ride.

**EEC-IV computer:** Instantly monitors and controls seven vital engine functions for optimum power/output and fuel efficiency.

**2300 HSC engine:** New High Swirl Combustion engine designed for quick power response.

**Transaxle:** Available with manual 4-speed, 5-speed or automatic transaxle.

**Computer refined interior:** Seats five passengers. More rear passenger room than a Mercedes 300D.

**Quality is Job 1:** Body fit tolerances that can be compared with European Sports Sedans.



Warning: The Surgeon General Has Determined  
That Cigarette Smoking Is Dangerous to Your Health.

**Pleasure is where you find it.**

**Discover  
Viceroy  
Satisfaction.**

VICEROY Rich Lights Kings, 9 mg. "tar", 0.7 mg. nicotine,  
VICEROY Kings, 15 mg. "tar", 0.9 mg. nicotine av. per  
cigarette, FTC Report Mar. '83.

